THE

PENNY CYCLOPÆDIA

OF

THE SOCIETY

FOR THE

DIFFUSION OF USEFUL KNOWLEDGE.

VOLUME X.

ERNESTI——FRUSTUM.

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THE SOCIETY FOR THE DIFFUSION OF USEFUL KNOWLEDGE.

ERNESTI, JOHN AUGUSTUS, was born at Tennstadt, in the Thüringer Wald, on the 4th August, 1707. He was educated at Wittenberg and Leipzig, and became conrector of the school of St. Thomas, in the latter city, in the year 1731. He succeeded J. M. Gessner as rector in 1734. While engaged in this situation he acquired a great reputation as a classical scholar; so much so, that in 1742 the University of Leipzig violated its own rule of never electing to any professorship the master of a school, and appointed him professor extraordinary of antient literature. He was made professor of eloquence in 1756, and professor of theology, with the degree of Dr., in 1758: he held the two last named professorships together till 1770, when he gave up the former to his nephew, Augustus William. He died on the 11th September, 1781. Ernesti was a man of considerable abilities, and especially of a very methodical mind, to which are due the great improvements in the system of teaching introduced by him, and still, to a certain extent, adopted in the German universities. He was well acquainted with the classics, and no mean proficient in theological learning. His Latin style is very elegant for a German, little inferior indeed to that of Ruhnken, and fully equal to that of Wyttenbach: a good specimen of his Latinity may be seen in A. Matthiä's *Eloquentia Latina*. His knowledge of Greek, though less accurate, was still very respectable. The work for which he is best known is his edition of Cicero, which has been made the basis of all subsequent ones. The third and last edition of this author published by him was printed at Halle in 1775. His *Clavis Ciceroniana*, or Index of words and subjects to Cicero's works, is still in general use. Besides his Cicero, Ernesti's *Initia Doctrinæ Solidioris* and *Institutio Interpretis Novi Testamenti* are much esteemed by students at the present day; the latter has been recently translated into English. The edition of Homer which Ernesti published in 1759-65 is merely an improved reprint of the hackneyed edition by Dr. Clark. It was republished by Dindorf in 1824. His edition of Callimachus, which appeared in 1761, is suspected to have owed a good deal of what is valuable in it to the contributions of Ruhnken. An account of it is given in the 'Museum Criticum,' vol. ii., p. 151. Ernesti's editions of Polybius, Tacitus, and Suetonius, have been quite superseded by those of Schweighäuser, Bekker, and F. A. Wolf.

ERNESTI, AUGUSTUS WILLIAM, nephew of the preceding, was born at Frohndorf, near Tennstadt, the 26th November, 1733. He was a pupil of his uncle at Leipzig, was made professor of philosophy there in 1765, and, as has been mentioned, succeeded, on his uncle's resignation, to the professorship of eloquence (in 1770). He died of apoplexy on the 29th July, 1801. He was principally distinguished as a very good Latin scholar. His best known work is an edition of Livy, with a very copious glossary, which was reprinted twice in his lifetime; the third edition was in the press when he died, and was completed by Schäfer.

ERNESTI, JOHN CHRISTIAN THEOPHILUS, also a nephew of John Augustus, was born at Arnstadt, in the Thüringer Wald, in 1756. He was professor of philosophy in the University of Leipzig from 1782 to 1801, when he succeeded his cousin, Augustus William, as professor of eloquence. He died on the 5th June in the following year. This scholar published editions of Silius Italicus and Æsop; *Lexicon Technologiæ Græcæ Rhetoricæ*, Lips. 1795; *Lex. Techn. Romanorum Rhetoricæ*, Lips., 1797 (both very useful works); *Hesychii Glossæ Sacræ*, 1785; *Suidæ et Phavorini Glossæ Sacræ*, 1786; a translation into German of Du mesnil's Latin Synonyms, and a German version of the principal works of Cicero. (Cicero's *Geist* and *Kern*, 1799-1802.)

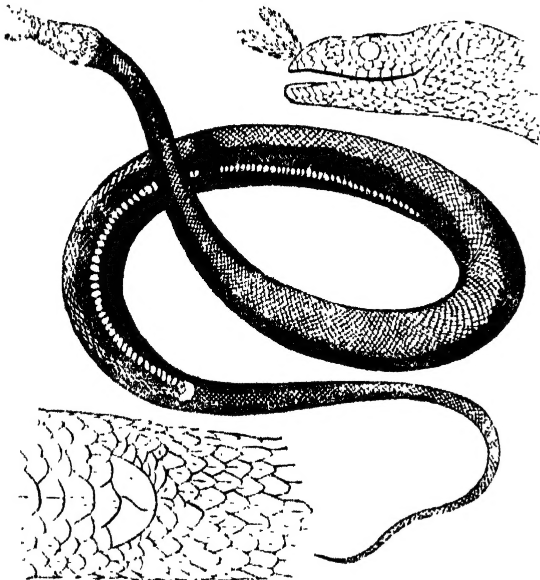
ERPE'NIUS. The celebrated orientalist, Thomas Erpenius, or Thomas van Erpen, was born at Gorcum, on the 7th of September, 1584. At the age of ten years he was sent to Leyden, where he received his education; and in 1608 he took the degree of Master of Arts in the university of that town. He had studied chiefly theology and oriental literature, and after the termination of his academic education, he undertook a tour to England, France, Italy, and Germany, for the farther prosecution of his favourite pursuits. At Paris he became acquainted with Isaac Casaubonus, and availed himself of the Arabic instructions of a learned Maronite, Joseph Barbatus, then a resident in the French capital. Erpenius returned to his native country in 1612, and was in the following year appointed professor of Oriental languages in the university of Leyden, an office to which was added subsequently that of Arabic interpreter to the Netherlands. On two occasions, in 1620 and 1621, he was sent to Paris on business of the university of Leyden. With these interruptions he seems to have devoted himself exclusively to the cultivation of Oriental literature. He established an Arabic press at his own house, and employed himself in editing a number of works, which have been of the greatest utility in promoting the cause of Oriental learning. He died of a contagious disease at the age of forty, November 13th, 1624. The work which has contributed most to give celebrity to the name of Erpenius is his 'Grammatica Arabica, quinque libris methodice explicata,' published at Leyden in 1613, 4to. It has often been re-edited with additions and alterations, and has become the foundation of nearly every subsequent Arabic grammar printed in Europe down to that of Silvestre de Sacy. The most remarkable of Erpenius's other publications are the following: 'Proverbiorum Arabicorum centuriæ duæ,' Leyden, 1614 and 1623, 8vo.; 'Locmani Sapientis Fabulæ et selecta quædam Arabum Adagia,' Leyden, 1615, 8vo.: an edition of an Arabic version of the New Testament and of the Pentateuch, the former published in 1616, the latter in 1622; an edition of the chronicle of Elmakin, with a

[illegible] translation, published after his death, under the title '[illegible] Historia Saraconica,' Leyden, 1625, fol.; two original [illegible] Arabic grammar, bearing the title, 'Grammatica Arabica, dicta Giarumia, et libellus centum Regentium,' Leyden, 1617, 4to.; and a Hebrew Grammar, 'Grammatica [illegible] generalis,' Leyden, 1621, 8vo.

ERPETOLOGY. [HERPETOLOGY.]

ERPETON, Lacépède's name for a genus of serpents placed by Cuvier next to *Eryx*. The name should be written *Herpeton*.

The genus is furnished with two soft prominences, covered with scales, on the muzzle. The head is protected by large plates; those beneath the belly are not large, and those beneath the tail scarcely differ from the other scales. The tail however is very long and pointed. Cuvier, who speaks of the priority of Lacépède, who first described the genus under the name of *Erpeton*, remarks that Merrem has changed the name to *Rhinopirus*.



Herpeton tentaculatus.

ERRATIC BLOCKS are those weather-worn and more or less rounded fragments of the harder rocks which are found very widely scattered over the surface of the earth, and at great distances from the places whence they are supposed to be derived.

In size they vary from ten thousand cubical feet and upwards to a few inches. M. Brongniart has proposed to designate the several sizes by particular names, as gigantic, metric, cephallary, pugillary, &c. But in England we generally confine the term erratic blocks to the larger masses, calling those of middling size boulders, and arranging the smaller along with gravel: this is, however, too vague. The nature of erratic blocks is not less various than their size. Every species of rock seems to have contributed a portion of its substance towards the mass, though the harder, being better capable of resisting the disintegrating and corroding influence of atmospheric causes, are found in the greatest abundance, such as quartz, petrosilex, greenstone, granite, porphyry, syenite, gneiss, primitive and transition limestone, dolomite, serpentine, siliceous pudding-stones, siliceous sandstones, &c.

The distribution and situation of these blocks are also very different. Seldom isolated, they are generally found in patches or groups, as in the environs of Geneva, the plains of Westphalia, in Sweden, &c.; or in long bands or trains, as in the north of Mecklenberg Strelitz, where they run in a direction west-north-west and east-south-east; or widely spread over considerable tracts, as between Warsaw and Grodno, between St. Petersburg and Moscow, in East Prussia, &c. Sometimes they cover horizontal plains, as in the north of Germany; sometimes they rest on the sloping sides of mountains, as in the Alps and the Jura, and occasionally on the very tops of lofty eminences, as on the summits of the calcareous mountains of Rettwick, of Rædaberg, and of Osmund, about 6000 feet above the level of the sea. Sometimes they are seen in greatest abundance at the bottom of valleys where they open into the plains, and in other instances they are found collected in the largest quantity in the high and narrow parts of the valleys, as is observed at Detmold and east of Lemgo. At times they are so abundant as to be accumulated into hills of a particular form, as is the case in Smaland, in Sweden; and sometimes they form even mountains of considerable height, as may be seen near Quedlio, in Norway; and what is remarkable, the larger blocks are at the top, the others diminishing gradually towards the bottom.

Though generally superficially disposed, erratic blocks are however in some places found imbedded in a fine sand which has nothing in common with their nature or origin, as in the plains of Westphalia. Some blocks (and this may depend either on their own particular nature, or the greater or less friction to which they have been subjected, the length of time they have been exposed to atmospheric influence, or the nature of the climate,) have their angles and edges as sharp as though they were just detached from their native mountains, as is the case in the neighbourhood of Groningen.

When the erratic blocks are not at any great distance from the spots whence they come, they may be easily traced up to their origin. Thus those which are in the basin of the Rhine come from the Grisons; those of the valley of the lake of Zürich and of the Limmat have been detached from the mountains of Glaris; those of the basin of the Reuss come from the rocks at the source of this river; and those of the Aar and the Jura from the lofty mountains in the canton of Berne. Even those which cover the widely extended tract from Holland on the west, to St. Petersburg and Tver on the east, are supposed by Von Buch, Hausmann, Brugmans, Alex. Brongniart, &c., to be traceable to Scandinavia. It is however remarkable that, contrary to what is generally observed of transported debris, the blocks are frequently largest as they are farthest removed from the place whence they came, diminishing gradually in size as they approach the parent rock; thus the blocks found in Mecklenberg and Seeland, which are ascertained to be derived from the Scandinavian peninsula, are larger than the blocks of the same rocks in Scania and East Gothland, and they disappear altogether close to the primordial mountains whence they were derived.

In certain places the blocks are almost exclusively of a particular kind, while in others they vary greatly in their mineral character, proving, together with the ascertained situation of the same rocks in situ, that they must have been assembled from various quarters. This is the case with the erratic blocks of Yorkshire, and with those of Lithuania, for though the greater part, perhaps, of those in the latter locality may be similar to the rocks in Sweden and Norway, there are many evidently derived from other places.

As for the direction in which the bands of erratic blocks seem to lie, and the quarter whence they seem to have come, they are very various. We have just seen that in the north of Mecklenberg the trains are in a line west-north-west and east-south-east. Count Rasoumovski observes that, when many blocks are accumulated they form parallel lines with a direction from north-east to south-west. Brongniart says they have a general direction north and south. Sir James Hall speaks of those in the neighbourhood of Edinburgh as coming from the west. We have said that those on the north of the Alps come from the south.

If any thing further were necessary to complicate the problem of erratic blocks, it is the immense distance at which they are sometimes found from the nearest rocks of similar composition; thus blocks of granite are found on the mountains of Potosi, while the nearest granite rocks are in Tucuman, about four hundred leagues off. Nor is distance all; the detached blocks are found separated from their parent rocks by intervening hills, broad and deep valleys, as that of the Aar, and even by straits and seas: thus in the north of Cumberland there are boulders which have been transported across the Solway Frith from Dumfries, and the blocks on the low plains of Germany are separated from their parent rocks by the Baltic.

England, as well as the continent of Europe, has many spots covered with erratic rocks, some of which seem to be derived from Norway, while others are evidently the debris of our own mountains. For details we refer the reader to the observations and works of Sedgwick, Conybeare, Lyell, Buckland, Phillips, Hibbert, &c.

Erratic blocks are also common in America and other parts of the world.

From what has been already said, and from the circumstance of erratic blocks lying on some of the most modern formations, it will be easily conceived that they present one of the most inexplicable of geological phenomena. The blocks on the Jura, and from the Alps generally, having first attracted notice, have given rise to a great variety of hypotheses, the most remarkable of which are the following:—1. De Luc was of opinion that these blocks had been projected into the air by the same force which upheaved the Alps, and that they had fallen at greater or lesser distances, according to the strength and direction of that force. 2. Von Buch, Escher, &c., attribute their existence to an immense débacle which swept down the blocks from the Alps to the foot of the Jura, up the slope of which they were forced by the impulse they had received, in the same way as a ball rolled along with force rises up a hillock. 3. Others, as Daubuisson, have thought that these blocks, which are almost wholly of transition rocks, were the remains of a mantle of these rocks, of later formation than the limestone of the Jura, and consequently much more recent than is generally admitted, and which, having been destroyed, left nothing but these testimonials of their former existence. 4. Dolomieu supposed that the summits of the Alps were formerly connected with those of the Jura by an inclined plane, which has been destroyed by the same revolution that precipitated the blocks from the summit of the Alps to the plateau, and into the valleys of the Jura. 5. Venturi has attempted to explain the passage of the blocks from the Alps into the basin of the Po, by floating them down on rafts of ice. 6. Others have upheaved the Jura, which they suppose to have been formerly on a level with the base of the Alps, and with it the blocks which had rolled down upon this calcareous plain. 7. Finally, Von Buch, extending his general theory to the particular phenomenon, thinks that the dispersion of the blocks is the result of an upraising of the Alps posterior to the formation of the tertiary rocks.

M. Brongniart very justly observes that these hypotheses leave many difficulties unexplained: he conceives that as the phenomenon of erratic blocks is a very general one, it is presumable that the cause also is general. Certain it is that even if it were possible satisfactorily to assign a cause for the erratic blocks found upon the Jura, the same reasoning would hardly be applicable to other cases; and in the utter impossibility of discovering any single cause competent to the production of such different effects, we must have recourse to the more probable conjecture of M. Larivière, that the dispersion and disposition of erratic blocks have been effected in different ways. The more powerful cause however he conceives to be the transporting power of icemeers and icebergs, in which opinion he is followed by Mr. Lyell and others.

Erratic blocks, like other phenomena, are attended with their peculiar advantages: thus on hot and dry soils, and when not in too great abundance, they keep the soil cool and moist, sheltering it from the direct rays of the sun in the day, and thus diminishing the evaporation of its moisture. On cold soils they tend to maintain an equable warmth by diminishing radiation at night. In some countries they are the only building-stones, as in East Friesland and the neighbourhood of Groningen. In others they supply the necessary lime, as at Königsberg, Revel, &c. Those of a convenient size are used in Russia and Poland for paving the towns: when broken they are exceedingly well adapted for the repairs of roads.

ERRHINES (from *en* (ἐν), and *rhin* (ῥὶν), 'the nose'), medicines which are applied to the nostrils, and which cause an increased flow of the secretion of the membrane which lines them, and often of the contiguous cavities and sinuses; frequently also occasioning sneezing, and an unusual secretion of tears. Snuffs of different kinds are familiar examples of this class of substances, and these generally cause sneezing, at least when first employed; but others, such as the turpeth mineral, merely produce increased secretion of the membrane. Where sneezing ensues a considerable shock is felt over the whole frame, and of [illegible] effect advantage is sometimes taken to change the action of the system, or to remove morbid impressions, as when certain fits are impending, or for more limited purposes, such as dislodging any foreign body from the nose. The secondary effect of errhines is more frequently desired to give relief to the loaded vessels, by exciting them to an increased secretion. Hence they are used in various diseased conditions of the organ of smell, and even of the neighbouring organs, being supposed to influence the vessels of the eye, and even of the brain. Some affections of the eye, and also of the head, are certainly relieved by such means, and their occasional use may be permitted; but the habitual use of errhines is in most cases objectionable, and followed by hurtful consequences. The membrane of the nose becomes thickened, its sensibility impaired, and the power of discriminating odours greatly lessened; while, if the substance be possessed at the same time of narcotic qualities, such as snuff procured from tobacco, the palate, the stomach, and other organs concerned in digestion likewise suffer, and loss of appetite with other symptoms of indigestion result.

ERRINA. [Milleporidæ.]

ERROR (in law), a fault in the pleadings or in the process, or in the judgment, upon which a writ, called a writ of error (breve de errore corrigendo), is brought. It is the ordinary mode of appeal from a court of record, and is in the nature of a commission to the judges of a court superior to that in which the judgment was given, by which they are authorized to examine the record, and on such examination to affirm or reverse the judgment according to law. For the cases in which this writ is issued, and the courts to which it is directed, see Bac. *Abr.* tit. *Error.*

ERSKINE, THOMAS LORD, was the third and youngest son of David earl of Buchan. He was born, according to some authorities, in January, 1748, and received the rudiments of his education partly in the high-school of Edinburgh, and partly at the University of St. Andrews. In 1764 he entered the navy as a midshipman, but not thinking his prospects of promotion in that service sufficiently good, he accepted a commission in the first regiment of foot in 1768. In 1770 he married Frances, daughter of Daniel Moore, M.P. for Marlow, and soon after went with his regiment to Minorca. Upon his return to England, in 1772, he appears to have become remarkable for the brilliancy of his conversational talents. (Wraxall's *Memoirs*, vol. i. p. 152, and Boswell's *Life of Johnson*, vol. ii. p. 170, ed. 1799.) In 1775, at the pressing solicitation of his mother, but it is said against his own judgment, he commenced the study of the law, and entered himself a student of Lincoln's Inn, and also as a fellow commoner of Trinity College, Cambridge, but only for the purpose of obtaining a degree, and thereby saving the additional term of two years, during which his name must otherwise have remained on the books of Lincoln's Inn. He became the pupil of Mr. Buller, and afterwards of Mr. Wood, both of whom were subsequently raised to the Bench. In Trinity term, 1778, Mr. Erskine was called to the bar, where his success was as rapid as it was brilliant. In the same term he was employed as one of the counsel for Capt. Baillie, lieutenant-governor of Greenwich Hospital, who was prosecuted for an alleged libel on the other officers of that establishment. The prosecution was in fact instituted by Lord Sandwich, then at the head of the admiralty, who, it appeared, had abused the charity by appointing landsmen as pensioners to serve his own electioneering purposes. Mr. Erskine's eloquent and indignant speech at once established his reputation; such indeed was its instantaneous effect, that thirty retainers were presented to him before he left the court. His practice and reputation increased so rapidly, that in 1783, when he had been scarcely five years at the bar, he received a patent of precedence at the suggestion of Lord Mansfield, who then presided in the court of King's Bench. In the same year Mr. Erskine was returned member for Portsmouth, through the interest of Mr. Fox, with the immediate view of supporting that minister's famous India Bill. In the House of Commons however his success by no means equalled the expectations which his friends had formed, though his parliamentary speeches would appear to have been far above mediocrity. In the same year also he was made attorney-general to the prince of Wales, an appointment which, to the disgrace of the advisers of the crown, he was called upon to resign in 1792, in consequence of his refusing to abandon the defence of Thos. Paine when he was prosecuted for his publication 'The Rights of Man.' In 1802 he was made chancellor of the Duchy of Cornwall; and in 1806, on the formation of the Grenville ministry, he was appointed lord chancellor,

and raised to the peerage by the title of Baron Erskine, of Restormel Castle, in Cornwall. His tenure of office was however brief, for on the dissolution of the ministry in 1807, he retired from public life. After this period Lord Erskine seldom appeared in his place in the House of Lords, but in 1820 he took a prominent part on the occasion of the trial of Queen Caroline.

In the later years of his life he was harassed by pecuniary embarrassments, arising from the loss of his large professional income, and an unfortunate investment of the fruits of his industry in land. His first wife died in 1805, and an ill-assorted second marriage increased his domestic disquietudes, injured his reputation, and gave pain to his friends. He died Nov. 17, 1823.

Lord Erskine's talents were peculiarly those of an accomplished and dexterous advocate: his eloquence formed an æra at the bar, and his addresses to juries captivated their understandings, their imaginations, and their passions; they were not marked by beauty of diction, richness of ornament, or felicity of illustration, but by strength, vigour, and simplicity, and a perfect freedom from colloquial vulgarisms. A remarkable feature in his speeches is an exact and sedulous adherence to some one great principle which he laid down, and to which all his efforts were referrible and subsidiary. As the principle thus proposed was founded on truth and justice, whatever might be his ingenuity in applying it to the particular case, it naturally gave to his address an air of honesty and sincerity which had great influence with the jury.

His extraordinary talent was developed by the times in which he lived; his indignant eloquence was called forth in defence of those individuals in whose persons the court and the government attacked the liberty of the press and constitutional freedom. The public mind was in a state of ferment from the recent events of the French revolution; and the government, in their hatred of the great principles of liberty then being established, forgot that actions, not principles, are the proper subjects for prosecution. As counsel for the defendants in these political prosecutions, Lord Erskine made his noblest and most successful efforts; fearless and zealous in the cause of his client, he spoke home truths without using unnecessary violence or low invective.

Lord Erskine has left few productions in writing; the principal are the Preface to Fox's Speeches, the political romance called 'Armata,' and a pamphlet entitled 'View of the Causes and Consequences of the War with France,' which passed through 48 editions. His speeches have been published in 5 vols. 8vo. Lord Erskine is not to be considered as a literary man; but it is one of the many singularities in his history, that with a scanty stock of what is usually called literature, he should have been one of our purest classical speakers and writers. His study was confined to a few of the greatest models, and these he almost knew by heart. He greatly admired the writings of Burke, and frequently quoted them in his speeches.

Scanty notices of the life of Lord Erskine are published in Lardner's *Cyclopædia* ('Lives of British Lawyers') and the 3rd vol. of the *Gallery of Portraits*, from which this account has been taken. There are some remarks upon the style of his eloquence in Butler's *Reminiscences*, vol. i. p. 70. His statue is in Lincoln's Inn Hall.

ERUCI'VORA. (Zoology.) [LANIADÆ.]

ERUPTION. [VOLCANO.]

ERWIN. [STRASBURG.]

ERYCI'NA. [VENERIDÆ.]

E'RYON, Desmarest's name for a macrourous crustacean, only known in a fossil state.

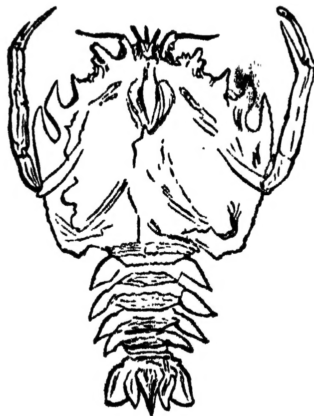
External *antennæ* short (one-eighth of the total length of the body including the tail), setaceous, provided at their base with a rather large scale, which is ovoid and strongly notched on the internal side; *intermediate antennæ* setaceous, bifid, much shorter than the external ones, and having their filaments equal. *Feet* of the first pair nearly as long as the body, slender, linear, not spinous, terminated by very long and narrow chelæ, with fingers little bent, but slightly inflected inwards; *carpus* short; feet of the other pairs also slender, and those of the second and third pair terminated with pincers, like the feet of the crawfishes (écrevisses). *Carapace* very much depressed, wide, nearly square, but little advanced anteriorly, profoundly notched on its latero-anterior borders. *Abdomen* rather short, formed of six articulations, of which the four intermediate ones have their lateral borders prolonged in angles, well detached, as in the crawfishes. Caudal-fin formed of five pieces, of which the two lateral are entire, rather large, a little rounded on the internal side, and the three middle ones triangular and elongated, especially the intermediate one.

Locality.—Lithographic limestone of Pappenheim and Aichtedt in the Margraviat of Anspach. (Desmarest.)

M. Desmarest observes that this genus is entirely anomalous, and ought, in a natural classification, to form a section by itself. According to the method of Dr. Leach, it would belong, 1st, to the order *Macroura;* 2nd, to the second section, which includes those *Macroura* which are provided with a caudal flabelliform fin; 3rd, to the subsection B, which have the peduncles of the internal antennæ moderately elongated; 4th to the 5th division, which have the natatory blades of the extremity of the tail formed of a single piece, the second articulation of the abdomen not dilated, and rounded anteriorly and posteriorly on each side; and finally, feet to the number of ten.

M. Desmarest goes on to say that it is to the *Callianassæ*, the *Thalassinæ*, the *Gebiæ*, and the *Axii*, that *Eryon* bears relation. Nevertheless it has not, he observes, the habit of any of them. Its short depressed carapace, and its little elongated abdomen approximate it to *Scyllarus*, but its internal antennæ with short peduncles, its external setaceous antennæ and its great anterior didactylous feet, widely separate it from that genus. It cannot be confounded with *Palinurus*, which has the external antennæ, and the peduncles of the internal ones so long, and whose feet are all monodactylous; and, finally, it cannot be referred to the crawfishes or lobsters (*Astacus*), whose shell is differently formed, and which have the external natatory blades of the tail composed of two pieces; but Desmarest thinks that it is to the last-named genus that *Eryon* most approximates, taking into consideration its general character. He regrets that he has not been able to satisfy himself whether the four antennæ are inserted on the same horizontal line or not, a fact which would have assisted him in his comparison with other genera.

Example.—*Eryon Cuvieri.* Carapace finely granulated above, marked by two deep and narrow notches on the two latero-anterior borders, and finely crenilated on the latero-posterior borders. Length, four to five inches French.



Eryon Cuvieri.

The fossil was noticed by Richter, Knorr, and others, before M. Desmarest, as, indeed, he states.

ERYSI'PELAS (*Ignis Sacer, the Rose, St. Anthony's Fire*), an inflammation of the skin, occasioning a spreading redness, which occupies a broad surface, on which are formed vesicles or blisters, preceded by and accompanied with fever. The whole of the inflamed surface is painful, but the pain is not acute; it is rather a sensation of burning or stinging than of severe pain. The redness is not intense like that produced by phlegmon or boil, but is of a pale rose colour. There is always considerable tumefaction; the tumor is not surrounded by a definite boundary, but is diffuse, irregularly circumscribed, and unattended with a sensation of throbbing. The tumor is often soft and boggy. It is characterised by the vesications which form upon it.

The proper seat of erysipelas is the skin, but the appearance of the disease is somewhat modified according to the

part of the skin which is more especially inflamed. If the rete mucosum, or the part of the skin which is placed immediately beneath the cuticle [SKIN] be the principal seat of the inflammation, the vesication is remarkable; there is commonly a considerable discharge from the vesicles, and a free exfoliation of the cuticle: if, on the contrary, the inflammation be chiefly seated in the cutis vera, or the true skin, namely, that portion of the skin which lies immediately beneath the rete mucosum, the cellular tissue beneath the skin is always more or less involved in the inflammation, and then the tumefaction is considerable on account of the infiltration of the cellular tissue with serum poured out from the blood by the inflamed cuticle.

Erysipelatous inflammation is characterized by its tendency to spread, and thereby to cover a considerable portion of the external surface of the body. It creeps on in succession from one part of the skin to another until it extends to a great distance from the part originally attacked, the inflammation often disappearing from the former as it becomes established in the latter. Sometimes the inflammation appears to pass from the external surface to the internal organs, and occasionally the disease quits the surface as it attacks the internal organs, although more commonly the external and internal inflammation go on simultaneously, greatly increasing the severity and danger of the attack.

Erysipelas most commonly attacks the face, but it sometimes seizes on one of the extremities: the disease is always more severe when it attacks the head than when it is seated in any other part of the body.

The inflammation which appears on the external surface of the body in erysipelas is not the primary and essential part of the disease, but a remote event depending on a preceding state of disease affecting the whole system. This is proved by the fact that constitutional disturbance always precedes, commonly for the space of two or three days, the appearance of the local affection.

An attack of erysipelas comes on either with chills or a distinct cold shivering, attended with a sense of lassitude, aching in the limbs, restlessness, and that disordered state of the skin which has been expressively termed febrile uneasiness. There is from the beginning uneasiness or confusion in the head, which soon amounts to decided pain. This is accompanied with such a degree of drowsiness, that the attack may sometimes be predicted long before there is any appearance of redness or swelling in the face, from the inability of the patient to keep himself awake. The chilliness is soon succeeded by heat of skin; the appetite fails, the bowels are constipated, the tongue is dry and parched, there is sometimes nausea and vomiting; the pulse is always frequent, sometimes full, soft, and compressible, but occasionally hard and tense.

After these symptoms have continued some time, always one, generally two, and sometimes three days, there appears on some part of the face a redness, attended with burning heat and tingling. Commonly a red spot appears on one cheek; after a short time a similar spot appears on the other cheek; often the redness spreads successively from one cheek to the other across the nose, which is completely involved in the affection: from the nose it extends to the forehead, and thence over the whole scalp. Soon after the redness appears the face begins to swell; and by the second night, or the morning of the third day from the commencement of the fever, the eyes are completely closed, the eyelids exceedingly prominent, the nose distended, and the ears tumid, red, shining, and burning. On the fourth or fifth day the vesications appear on the inflamed surface, which break on the fifth or sixth, when the redness changes to a yellowish hue. The whole face is now so turgid that the form and expression of the features are completely lost, and the patient could not possibly be recognized by his most intimate friend.

The surface of the skin in the blistered places becomes covered with a brownish or dark coloured scab, which often gives a livid or blackish appearance to the part; but this livid colour seldom goes deeper than the surface, and does not proceed from any degree of gangrene affecting the skin. On the parts of the face not affected with blisters the cuticle is destroyed, and desquamates, a new cuticle being formed beneath it. Though the face, in general, however intensely inflamed, seldom goes into suppuration, yet it is by no means uncommon for matter to form in the tumid eyelids.

Occasionally, though not often, when erysipelas attacks the face, it extends to the mouth and fauces, and even to the pharynx and larynx, at the same time that it covers the neck and chest externally. Dr. Copland mentions a case in which the enormous tumefaction of the neck and throat with the affection of the larynx and trachea, increased by the constriction produced by the integuments surrounding the neck and throat, caused suffocation in a few hours. When the inflammation extends to the fauces, throat, and larynx, it sometimes produces a species of croup.

On whatever part of the body the inflammation appears in erysipelas, even when it is strictly confined to the skin, its appearance is not attended with any remission of the fever which preceded it: on the contrary, the fever generally increases with the augmentation and extension of the inflammation.

The progress of the disease is more or less rapid, and its duration longer or shorter, according to the age, the temperament, and the vigour of the individual. In the young, the sanguine, and the robust, the tumefaction is sometimes fully formed on the second day, and the whole terminates on the sixth or seventh, while in the aged and the less vigorous it may be protracted to the tenth or twelfth, and the disquamation may not be completed before the fourteenth day. The average duration of the disease may be stated to be from eight to ten days.

When the fever and inflammation are intense, delirium comes on, which sometimes rapidly passes into coma. These are most alarming symptoms, indicating a severe and too often a mortal inflammation of the brain. In such cases death frequently takes place, with many of the symptoms of apoplexy on the seventh, ninth, or eleventh day of the disease. 'In such cases,' says Dr. Cullen, 'it has been commonly supposed that the disease is translated from the external to the internal parts. But I have not seen any instance in which it did not appear to me that the affection of the brain was merely a communication of the external affection, as this continued increasing at the same time with the internal.

'When the fatal event does not take place, the inflammation, after having affected a part, commonly the whole of the face, and perhaps the other external parts of the head, ceases. With the inflammation the fever also ceases; and, without any evident crisis, the patient returns to his ordinary state of health.'

In the cases which prove fatal, on the examination of the body after death, the inflamed skin is found infiltrated with serum, which is sometimes mixed with pus, and occasionally portions of the skin are found disorganized, and in a state of gangrene. It is remarkable that the blood in the large vessels and in the cavities of the heart is semifluid, and that the veins which proceed from the inflamed parts are in a state of inflammation, and contain pus, more especially when the inflammation has extended from the skin to the cellular tissue and has passed into suppuration. In the cases attended with delirium and coma the membranes of the brain, and especially the arachnoid, are thickened and opaque with the effusion of serum between the membranes and into the ventricles. If the disease has been complicated with inflammation of the fauces, pharynx, œsophagus, trachea, and bronchi, these organs present the ordinary signs of inflammation; and the same is true with regard to the mucous membrane of the stomach and intestines; but in all these cases the signs of inflammation are much more closely allied to those which occur in fever than to those which are proper to pure inflammation.

There is a peculiar condition of the skin which seems to predispose to erysipelas connected with the irritable or bilious temperament, and a plethoric habit of the body. The occurrence of the disease once renders the skin peculiarly susceptible to its recurrence. Unwholesome and indigestible food, the excessive use of spirituous liquors, the suppression of the excretions, and more especially the suppression of the perspiration, of the bile, and of the catamenial discharge, predispose to erysipelas.

The exciting causes are exposure to cold and moist air after the body has been previously heated; exposure to sudden and great alternations of temperature; exposure to great heat however produced, whether by the direct rays of the sun or by a fire; intemperance; unwholesome articles of diet, as shell-fish, or stale and rancid fish; rich, oily, fat, or smoked meats; impure states of the atmosphere; an impure state of the body, arising from a morbid condition of

the blood, in consequence of the suppression of its depurating processes, whence the frequent occurrence of the disease in the advanced stages of fever, greatly complicating the state of fever and exhausting the little remaining strength of the patient. Violent emotion of mind has also been observed to be an exciting cause of erysipelas in those powerfully predisposed to the disease; in whom also local irritants often induce it, as wounds or punctures in the skin, the bites of leeches, the stings of insects, inoculation with variolous or vaccine matter. Instances are on record in which both variolous and vaccine matter have produced in children of irritable habits, two or three days after inoculation, an erysipelatous inflammation which has proved fatal.

It is a point much disputed whether erysipelas be capable of being propagated by contagion. 'The disease,' says Dr. Bateman, 'has been noticed in several hospitals to prevail in certain wards, among patients admitted with different complaints; but has seldom been known to spread in private houses. Dr. Wells, indeed, has collected several examples of the apparent communication of erysipelas by contagion, which occurred in private families. But such are at all events extremely rare, and perhaps never happened in well ventilated and cleanly houses. From the Royal Infirmary, at Edinburgh, this disease, like the puerperal fever, was banished by ventilation, white-washing, and other means of purification; and it has not occurred in any hospital of late years, since a better system has been adopted in these respects. Other diseases, not infectious in themselves, appear to become united with typhus, or contagious fever, under similar circumstances, and thus to be propagated in their double form; the dysentery, for example, the peritonitis of women in child-bed, ulcerated sore throat, &c. The simple phlegmonous erysipelas, at all events, was never seen to spread like an infectious disease.'

The danger of erysipelas is in proportion to the intensity of the inflammation, and the severity of the affection of the brain. The danger is also imminent when there is great tumefaction of the throat, or when the inflammation spreads to the respiratory passages and the respiratory organs. As long as the inflammation is confined to the external surface, and the fever remains moderate, the brain not much affected, and the heart's action not inordinate, a favourable termination of the malady may be expected. The different varieties or species of the disease are also attended with very different degrees of danger. Authors usually describe four species, namely, the phlegmonous, the œdematous, the gangrenous, and the erratic. The phlegmonous is that form of the disease in which the inflammatory state of the system is the most distinctly marked. In the œdematous the fever and inflammation are less intense; but the tumefaction is so great that the appearance of the face resembles that of a bladder distended with water. This form of the malady most commonly affects persons of debilitated constitutions, who have been previously attacked or are simultaneously affected with dropsy, or some other chronic disease, incident to a cachectic state of the system, and induced commonly by habitual intemperance. It is always attended with considerable danger, for the disorder of some internal function increases with the advancement of the external disease. Very frequently delirium and coma come on at the height of the disease, and terminate fatally on the seventh or eighth day; or, in other cases, the symptoms continue undiminished, and death occurs at a later period. When this form of the disease attacks one of the extremities, it is attended with but little danger.

In the gangrenous form of the disease the colour of the affected part is of a dark red, and scattered vesicles with a livid base appear upon the surface, which frequently terminate in gangrenous ulcerations. Suppuration and gangrene of the muscles, tendons, and cellular tissue often take place, producing little caverns and sinuses, which contain an ill-conditioned pus, together with sloughs of the mortified parts, which are ultimately evacuated from the ulcers. It is accompanied with symptoms of low fever, in the progress of which delirium comes on, soon followed by coma. It is always a tedious and precarious and often a fatal form of the disease.

In the erratic species the inflamed patches appear one after another in different parts of the body, thus travelling in succession from the face to the neck and trunk, and from the trunk to the extremities. It often happens that each accession of the complaint is less and less severe as it recedes to a greater distance from the part first affected, and this form of the disease commonly terminates favourably in a week or ten days.

In the phlegmonous species, characterized by the presence of inflammatory fever, the method of treatment must be widely different from that proper to the œdematous and gangrenous, in which there is the very opposite state of the system. In the young, the plethoric, the sanguine, and the robust, at the commencement of the attack, when there is much pain in the head, when the heat of the skin is intense, and the pulse is full and strong, the remedies proper in any other case of inflammatory fever are required; namely, bleeding to the extent of the subdual of the inflammatory condition of the system. In such a case there is danger that the disease will terminate in fatal inflammation of the brain, unless there be a free abstraction of blood. But it must be borne in mind that erysipelas does not ordinarily occur in the youthful and vigorous constitution; that it is not often accompanied with the signs of acute inflammation; that blood-letting is required only when acute inflammation is present, and that the extent of the bleeding must be strictly regulated by the degree of the inflammatory action. In an ordinary attack of phlegmonoid erysipelas, general bleeding is not necessary, at least in the constitutions commonly found in a crowded city. Moderate purging, diaphoretic and saline medicines, strict confinement to bed in a cool apartment, with the diet appropriate to febrile diseases, are all the remedies required. If local bleeding and blistering appear to be indicated, care must be taken not to apply the leeches or the blister near the inflamed surface. Various applications to the inflamed surface have been recommended, the most common of which is flour, or some other absorbent powder, to imbibe the fluid which oozes from the vesications. The utility of such applications is doubtful. 'The application of powdery substances,' says Dr. Bateman, 'has commonly, according to my own observation, augmented the heat and irritation in the commencement; and afterwards, when the fluid of the vesications oozes out, such substances produce additional irritation, by forming, with the concreting fluid, hard crusts upon the tender surface. In order to allay the irritation produced by the acrid discharge from the broken vesications, Dr. Willan recommends us to foment or wash the parts affected, from time to time, with milk, bran, and water, thin gruel, or a decoction of elder-flowers and poppy-heads. In the early state of the inflammation, when the local heat and redness are great, moderate tepid washing, or the application of a cool but slightly stimulant lotion, such as the diluted liquor ammoniæ acetatis, has appeared to me to afford considerable relief.'

In the œdematous species, when it occurs in broken-down constitutions, the result of habitual intemperance, even purgatives must be very cautiously administered; the strength must be sustained by mild nutritive diet, and tonics, as cinchona or quinine, and even stimulants, as camphor, wine, or the beverage to which the patient has been habituated, are required. The aperients employed should be mild alterative mercurials, with equal parts of castor-oil and the spirit of turpentine administered perhaps every alternate morning.

In the gangrenous species, quinine in considerable doses through the whole course of the disease, opium, camphor, the mineral acids, wine, brandy, and the general regimen adapted to gangrenous affections occurring under other circumstances, must be freely employed. The remedies indispensable in the phlegmonoid species would be fatal in this form of the disease, while the remedies which afford the only chance of saving life in the latter would produce fatal inflammation of the brain if administered in the former.

ERYTHACA (Zoology). [BLUE BIRD, vol. v. p. 17; SYLVIADÆ.]

ERYTHE'MA, a superficial redness of some portion of the skin, varying in extent and form, attended with disorder of the constitution, without vesications, and uninfectious. It is distinguished from erysipelas by the slight degree of constitutional disorder, by the slight degree of local pain, by the more uniformly favourable termination of the disease, and by the absence of tumefaction and vesication.

Authors describe several species of this affection, namely,

1. The fugacious (*Erythema fugax*), consisting of red patches of an irregular form, resembling the redness produced by pressure. These patches appear successively on the arms, neck, breast, and face. This affection is gene-

rally indicative of, and produced by, some disorder of the digestive organs.

2. The shining (*Erythema læve*), exhibits a uniformly smooth shining surface, and chiefly appears on the lower extremities in confluent patches. It is sometimes symptomatic of disorder of the digestive organs; occasionally attends the catamenia in delicate and irritable females, but most commonly accompanies anasarca or œdematous swellings. Under whatever circumstances anasarca occurs, so as greatly to stretch the skin, this Erythema is liable to be produced, and is often checkered with patches and streaks of a dark red and purple hue. It commonly terminates in extensive disquamation of the skin, and may be considered as merely a modification of œdematous erysipelas.

3. Marginated (*Erythema marginatum*) occurs in patches which are bounded on one side by a hard elevated tortuous red border, in some places obscurely papulated; but the redness has no regular boundary on the open side. The patches appear on the extremities and loins in old people, and remain for an uncertain time, without producing any irritation in the skin. They are connected with some internal disorder, and may be considered as indicative of serious and dangerous diseases.

4. Papulated (*Erythema papulatum*) appears chiefly on the arms, neck, and breast, in irregular extensive patches, and most frequently in females and young persons. The patches are of a bright red hue, often slightly elevated; and for a day or two before the colour becomes vivid they are rough or imperfectly papulated. The redness afterwards continues for several days; and, as it declines, assumes, in the central parts, a bluish or pale purple tinge. This variety is generally attended by a tingling sensation, passing to soreness as the colour changes; and sometimes with much constitutional disturbance,— with a frequent small pulse, loss of appetite, depression of strength and spirits, watchfulness, and pains or tenderness of the limbs, but the general disorder is trifling.

5. Tuberculated (*Erythema tuberculatum*) is merely a slight modification of the advanced stage of the papulated.

6. Nodose (*Erythema nodosum*) consists of large oval patches on the fore part of the legs; the long diameter of the patch is parallel with the tibia; these patches slowly rise into hard and painful protuberances, and as regularly soften and subside in the course of nine or ten days. The red colour turns bluish on the eighth or ninth day, as if the leg had been bruised. It chiefly affects children, and particularly females, and is very seldom observed in boys. It is preceded by slight febrile symptoms for a week or more, which generally abate when the erythema appears. It is sometimes connected with the approach of the catamenia, and its premature disappearance is not unfrequently succeeded by dangerous internal disease, as inflammation of the lungs.

The primary causes of erythema are the friction of contiguous parts, especially in fat persons; the accumulation of morbid secretions and excretions on the skin, as the matter of the perspiration, of the leucorrhœal discharge, of the catamenia, and of the alvine and urinary evacuations, in the adult in the course of other diseases, and in the infant in consequence of a want of proper ablution. It is also constantly produced by irritating articles of food and drink, and is the sign and the result of a disordered state of the digestive organs.

In most cases the affection disappears soon after the removal of the cause which produces it—by free ablution where it is the result of irritating matters on the skin, and its disappearance is assisted sometimes by the application of an absorbent powder to the inflamed surface, and at other times by the use of a gently stimulating lotion, as the spirit wash. When the disease is dependent on a disorder of the digestive organs, it can be removed only by the remedies proper for the removal of the stomachic, the hepatic, or the intestinal derangement. For the restoration of these organs to their sound condition, the most appropriate remedies are light diet, diaphoretics, the mercurial alteratives in combination with gentle aperients, and the mineral acids as tonics. (Bateman's *Practical Synopsis of Cutaneous Diseases*; Copland's *Dictionary of Practical Medicine*.)

ERYTHRÆA, a pretty genus of annual plants, belonging to the natural order Gentianaceæ, and inhabiting dry sandy places in Great Britain and other parts of Europe, especially near the sea. The species have small oval sessile ribbed radical leaves, diminishing in breadth as they ascend the stem; a corymbose stem, a five-cleft calyx, pink funnel-shaped flowers, with a short five-lobed limb, five stamens, spiral anthers, two roundish stigmas, and a linear capsule. They are all extremely bitter, and are collected by country people, under the name of centaury, as a substitute for gentian, in domestic medicine. English botanists reckon four supposed species.

ERYTHRÆA CENTAURIUM, Lesser Centaury, an indigenous plant, common by way-sides and edges of fields, flowering in August, at which time it is to be collected. The whole plant is taken up; it has a square stem, with opposite entire three-nerved leaves. It is devoid of odour; the taste is strongly bitter, but not unpleasant: 100 parts of the fresh herb dry into 47; 10 pounds of the dry herb yield by a single coction 3 pounds of extract.

It contains a principle called Centaurin, which at present is known only as a dark brown extract-like mass; but which, united with hydrochloric acid, furnishes an excellent febrifuge medicine. As a bitter, it suits irritable systems better than any article of that class of medicines, and is therefore to be preferred. In other respects it has the general properties of bitter tonics.

ERYTHRIC ACID, a substance obtained by Bragnatelli from the mutual action of nitric and uric acids; by spontaneous evaporation rhombic crystals are obtained, which have first a sharp and afterwards a sweetish taste, redden litmus, become of a rose colour, and effloresce in the air. Instead of being a peculiar acid, Dr. Prout regards it as a compound of nitric and purpuric acid and ammonia.

ERYTHRI'NA, a leguminous genus of tropical trees and tuberous herbs, with ternate leaves, and clusters of very large long flowers, which are usually of the brightest red; whence the species have gained the name of coral-trees. Frequently their stem is defended by stiff prickles. They occur in the warmer parts of the Old and New World. An Indian species, E. monosperma, is said to yield gum-lac. De Candolle mentions thirty-two species; of which E. crista galli is commonly cultivated in greenhouses for the sake of its splendid blossoms.

ERYTHROGEN, a neutral crystalline fatty matter found by M. Bizio in bile altered by disease.

ERYTHRO'NIUM (Dens Canis), a pretty little bulbous plant, whose name, Englished dog's-tooth violet, is derived from the form of its long slender white bulbs, is a native of woody subalpine places among bushes and stones, in Croatia, Idria, and about Laybach; it also occurs in Switzerland, but more seldom, and is also met with in the north of Italy. It is not mentioned in the Floras of the south of Europe. Two or three varieties are known in gardens as gay hardy flowers appearing early in the spring; one with purple, a second with white flowers, and a third, elevated by some into a species, with a somewhat stronger habit of growth.

ERYTHROXY'LEÆ, a group of exogenous plants, con-

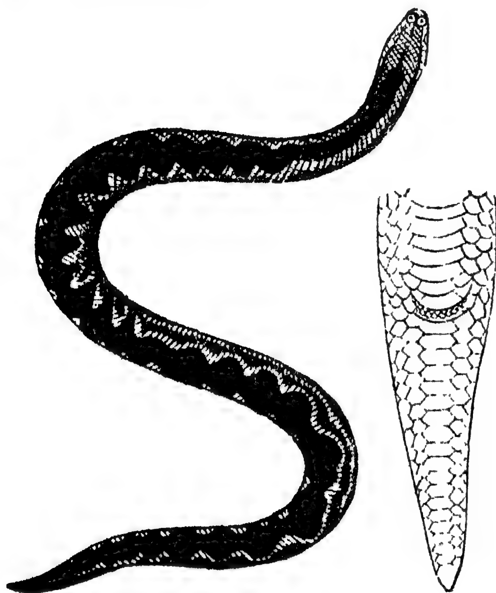


Erythroxylon laurifolium.

1. A calyx with the monadelphous stamens; 2, a petal with its appendage; 3, the ovary, with the three styles; 4, a half-ripe fruit; 5, a transverse section of the same, showing that one only of the seeds comes to perfection, the two others being abortive.

sidered by some as a distinct natural order; by others as a subordinate division of Malpighiaceæ. They have alternate stipulate leaves, and small pallid flowers. The calyx is five-lobed; the petals are five, with a remarkable appendage at their base, which afford one of the marks of distinction between Erythroxyleæ and Malpighiaceæ; the stamens are ten, slightly monadelphous. The ovary is superior, three-celled, with three styles, and solitary pendulous ovules. The fruit is drupaceous. Some of the species of Erythroxylon, the only genus, have a bright red wood, occasionally used for dyeing; but the most extraordinary species is the Erythroxylon coca, of whose inebriating effects a full account has already been given. [COCA.]

ERYX or ERIX, a genus of serpents separated by Daudin from *Boa*, and differing from it in having a very short obtuse tail, and the ventral plates narrower. The head of *Eryx* is short, and the characters generally would approximate the form to *Tortrix*, did not the conformation of the jaws place it at a distance from the last-named genus. The head, besides, is covered with small scales only. *Eryx* has no hooks at the vent.



Eryx Bengalensis.

ERZERU'M, ERZ-RU'M, or ARZRU'M, a town in Turkish Armenia, in 39° 57′ N. lat., and about 41° 15′ E. long., towards the eastern extremity of an extensive and fertile plain between 30 and 40 miles in length and from 15 to 20 miles in its greatest breadth. This plain is watered by the Karà Sù, or western branch of the Euphrates, which rises at its eastern extremity, and from whose banks the town is three or four miles distant. The town is very large, and is partly surrounded by an old castellated wall, with a ditch, and on its southern skirts stands a citadel encircled by a double wall flanked with towers very close to each other, and with a ditch: it has four gates, and incloses the palace of the pacha and nearly the whole of the Turkish population. But a large portion of Erzerum is unwalled, and contains the principal bazaars and khans. The houses for the most part are low, and built of wood, but the bazaars are extensive, and well supplied with provisions. Erzerum has nearly forty mosques, a Greek church, and a large Armenian chapel. In the beginning of this century the population was estimated at 100,000 individuals; and in 1827 at 130,000. But being soon afterwards occupied by the Russians, the greatest part of the inhabitants abandoned the town, the Armenians emigrating to Russia, and the Turks retiring to the adjacent parts of Asia Minor. Since its restoration to the Turks by the peace of Adrianople the place is slowly rising from its state of decay, but in 1835 its population did not exceed 15,000. We do not know if any of its numerous manufactures have been revived. Before the Russian invasion considerable quantities of silk and cotton cloth were made here, and much leather tanned; there were also some manufactures of copper vessels.

Erzerum is important as a commercial town. Besides the produce of its manufactures it exports the excellent grain which is grown in the plain. But it derives other commercial advantages from its being situated on one of the most frequented caravan roads of Western Asia, which leads from Persia and Georgia to the great commercial towns of Asia Minor. This renders Erzerum an important place also in a political and military point of view. It is the seat of a pasha, and the pashalik yields only in rank and extent to that of Bagdad. (Kinneir; Brant, in *London Geogr. Journal*, vi.)

ERZGEBIRGISCHE-KREIS (circle of the Ore Mountains), a large province of the kingdom of Saxony, which takes its name from the mountains which bound it on the south and separate it from the kingdom of Bohemia. On the north it is bounded by the circle of Leipzig and by the duchy of Saxe-Altenburg; on the west by the grand duchy of Saxe-Weimar, the principality of Reuss, and the circle of Voigtland; and on the east by the circle of Meissen. It is the largest and most populous province in the kingdom, and contains an area of about 1747 square miles, on which there are 58 towns, 13 market villages, and above 700 villages and hamlets. In 1829 the population was 488,863, and it is at present estimated at about 506,000. The surface rises gradually from the borders of the Leipzig and Meissen circles, until it reaches the southern frontier and the lofty summits of the Ore Mountains. The province is intersected in all directions by offsets from those mountains, and presents a constant succession of hills and valleys. The loftiest heights in it are the Fichtelberg, at the southernmost extremity of the province, which is 3968 feet, and the Auersberg, about eleven miles north-west of the Fichtelberg, which is 3132 feet above the level of the sea. The Freiberg or Eastern Mulde, the largest river in the province, flows through its eastern districts, and the Schneeberg or Western Mulde through the western districts; the centre is irrigated by the Zschoppau, Flöhe, Pöhl, Sehm, Bockau, Chemnitz, and other streams; the Weiseritz or Westritz partially traverses the most easterly part, and the Pleisse the most westerly. There are no inland waters deserving the name of lakes, but there are a number of mineral springs, chiefly used for bathing, at Wolkenstein, Wiesa, near Annaberg, &c. The province is full of woods and forests, particularly its most elevated parts, such as the vicinity of Schwarzenberg. The average height of the Erzgebirgische Kreis above the level of the sea is estimated at 1200 feet.

In consequence of the rugged character of the surface, the hard, stony soil, and the rawness of the climate, neither agriculture nor horticulture are pursued on a scale of sufficient extent to supply the wants of the province. Oats, rye, linseed, potatoes, and a small quantity of wheat, are cultivated; these articles are also imported from Bohemia and the adjoining circle of Leipzig. There are fine and extensive pastures, particularly in the vicinity of Zwickau, Chemnitz, Augustusberg, Freiberg, and Nossen, where large flocks of sheep are kept; but cattle-breeding, on the whole, is not so actively carried on as it might be. The province is well known for its large trout, its salmon, carp, and other fresh water fish.

The very name of this part of Saxony, 'the circle of the Ore Mountains,' indicates the peculiar character of its natural riches. It abounds in mines of silver, tin, lead, iron, cobalt, &c., the first working of which is said to have taken place in the middle of the twelfth century. Their most flourishing state was in the fifteenth, when the silver mines of Schneeberg and Annaberg and the tin mines of Altenberg were discovered and opened. At the present day they afford employment, either directly or indirectly, to upwards of 200,000 persons. The largest silver mines are in the neighbourhood of Freiberg, of which the Erbisdorf alone produced 3,048,500 ounces of silver between 1769 and 1818: their number is about 200, with 540 pits (zechen); they occupy 4800 hands, and their present produce is from 375,000 to 450,000 ounces annually. The other silver mines are at Schneeberg, Schwarzenberg, Annaberg, Marienberg, &c. The most considerable tin mines are at Altenberg and Geier; others at Schneeberg, &c. No mines in Saxony produce so much iron as those of Johann-Georgenstadt: this metal is also obtained at Schneeberg, Altenberg, &c. Near Aue and Bockau, to the south of Schneeberg, in what is called the 'Saxon Siberia,' lie the largest

cobalt mines, and smalts, or blue-colour works in Germany; of these smalts the yearly produce is between 9000 and 10,000 cwts., besides large quantities of arsenic, &c. The white porcelain-earth used in the royal china manufactory at Meissen is procured and prepared in this district. Much sulphur and vitriol are made at and near Beierfeld and Geier: magnesia and porcelain earth are obtained at Elterlein; and there are coal mines of importance at Planitz, and other spots near Zwickau. The value of all the silver sold in 1833 was 862,764 dollars (122,200*l.*); and in 1834 about 1,000,000 dollars (141,600*l.*). The cobalt and blue colour (smalts) produced 321,724 dollars, or about 45,500*l.* The lead mines yield annually about 500 tons; the tin about 3000 cwt.; the copper about 18 tons; and the iron between 4000 and 4500 tons.

Besides considerable manufactures of iron, tin, and copper ware, the largest of which are at Freiberg, Schwarzenberg, Wiesenthal, and Elterlein, there are extensive manufactures of thread, twist, linens, cotton goods, woollen cloths, flannel, woollen stockings, &c., at Chemnitz, Zwickau, Zschoppau, Oederan, &c. Laces and bobbinet are made at Altenberg, as well as Annaberg, where nearly a thousand hands are engaged in making tapes and ribands. Much serpentine stone is worked from the quarries of Zöblitz, and steel is made at Schedewitz near Zwickau. In the upland districts various articles in wood are manufactured.

This province also includes the independent earldom of Solm-Wildenfels, with an area of 31 square miles, the 6200 inhabitants of which are principally employed in making linen, coarse cottons, and stockings; and the possessions of the princes and counts of Schönburg, in the north-western part of the province, comprising an area of 252 square miles and a population of about 84,000, who are engaged in agriculture as well as manufactures. The chief town is Glauchau, on the Western Mulde, with 5000 inhabitants, and manufactures of woollens.

The province is divided into the 'Amtshauptmannschaftliche Bezirke' or bailiwics of Chemnitz, Zwickau, Walkenstein, and Freiberg. Chemnitz, in the north-west, contains the towns of CHEMNITZ (see vol. vii. p. 38), Frankenberg on the Zschoppau, 5200 inhabitants; Oederan, 3800; Zschoppau, on the river of that name, 3300; and in the Schönburg possessions, Lössnitz, 3450; Glauchau; Hohnstein, 3600; Waldenburg, on the western Mulde, 3000; Penig, on the same river, 3100; and St. Merane, 2700. The bailiwic of Zwickau, in the west and south-west, contains Zwickau, on the western Mulde, with 5100 inhabitants and large woollen manufactories; Werdau, on the Pleisse, 3600; Wildenfels; Schwarzenberg, on the Schwarzwasser, 1400; Wiesenthal, 1600; Johann-Georgenstadt, on the Schwarzwasser, 2700; and Schneeberg on the Schleenerbach, 5800. The bailiwic of Walkenstein, in the south, contains the towns of ANNABERG (vol. ii. p. 40); Wolkenstein on the Zschoppau, 1600 inhabitants; Geyer on the Pleisse, 1800; Zöblitz, 1100; Elterlein, 1200; and Stollberg, 3050; and the bailiwic of Freiberg, in the east, contains Freiberg, on the eastern Mulde, the chief town of the Erzgebirge circle, 11500 [FREIBERG]; Haynichen, on the Striegis, 3000; Nossen, on the eastern Mulde, 1200; Rosswein, on the same river, 3500, with woollen manufactures; Fraunstein, 800; and Altenberg, 1600.

ERZGEBIRGE (the Ore Mountains) is a mountain-range in Germany, extending along the boundary line of the kingdoms of Bohemia and Saxony. It begins about 25 miles south-east of Dresden, on the very banks of the river Elbe, and extends in a west-south-west direction to the sources of the river called the White Elster (Weisse Elster), about 12° 30′ E. long., where it is connected with the Fichtel Gebirge. The river Elbe divides its eastern extremity from the Winterberg, the most western of the mountains of Lausitz, or Lusatia. The Ore Mountains extend in length about a hundred miles, and their mean width is estimated to be more than thirty miles.

The highest part of the range, which is towards its southern border, forms partly the boundary-line between Bohemia and Saxony, but is mostly within the former kingdom. Its southern declivity, which is steep and intersected with narrow valleys, terminates in the valley of the river Eger, about 10 or 15 miles from the upper range. The valley of the Eger lowers gradually from west to east, from 1100 feet to 400 feet above the sea. The northern declivity of the range descends in more gentle slopes towards the great plain of Northern Germany; and these slopes are divided from one another by wide and open valleys. A line drawn from Pirna on the Elbe to Tharand, Freiberg, Chemnitz, Zwickau, and Reichenbach, indicates with tolerable correctness where the range on this side ceases. The undulating plain which lies contiguous to it may be from 500 to 600 feet above the level of the sea.

The highest portion of the range occurs on both sides of 13° E. long., but rather to the west of it. Here are the Keilberg, 4212 feet, the Fichtelberg, 3968 feet, the Schwarzberg, 3988 feet, and the Hassberg, 3248 feet above the sea. Farther east and farther west the range gradually sinks lower, the Great Chirnstein, on the banks of the Elbe, rising only to 1824 feet above the sea.

This range belongs to the primitive formation, granite and gneiss being everywhere prevalent, except along the banks of the Elbe, where sandstone almost exclusively occurs. It is rich in metals of almost every kind, from which circumstance indeed its name is derived, though it is less productive than it was some centuries ago. The working of the mines is pursued with great activity and skill, and it is stated that more than 10,000 families are dependent on them for their livelihood. Gold occurs in a few places, but is not so abundant as to pay for the labour of getting it. The silver-mines are considerable, and their annual produce amounts to 60,000 marcs, at 12 ounces to the marc; that of the iron-mines amounts to 3500 or 4000 tons. The tin-mines of Saxony are the most valuable on the European continent, and produce annually 140 tons. Copper is not abundant, and the annual produce does not exceed 30 tons; but from the lead-mines 400 or 500 tons are annually obtained; and of cobalt 600 tons and upwards. Arsenic, brimstone, and vitriol, are likewise abundant; and there is also quicksilver, antimony, calamine, bismuth, and manganese. Coal abounds in the neighbourhood of Dresden and Zwickau. One of the most remarkable mineral productions is the kaolin, or porcelain clay, which occurs in layers six feet thick at Aue, about 12 miles south-east of Zwickau, whence it is carried to Meissen, and there used in the manufacture of the fine china-ware. Several kinds of precious stones are found, as garnets, topazes, tourmalins, amethysts, beryls, jaspers, and chalcedonies.

The upper parts of the range are covered with extensive forests, which furnish fuel for the great smelting works. The lower slopes and valleys are well cultivated, but the produce is not sufficient for the maintenance of the great population which is employed in the mines and in the numerous manufactures of cotton, silk, and linen. Great quantities of corn are annually brought from the plain which lies to the north of the range.

Six great roads pass over this range. By the two most eastern Dresden communicates with Prague. The more eastern of these two runs from the last-mentioned place to Lowositz and Aussiz, passes near Perterswalde through the pass of Zehist, and hence descends to Giesshübel and Pirna. The more western goes from Lowositz to Töplitz, passes the range near Zinnwald, and descends through Altenberg and Dippoldiswalde to Dresden. The third road leads from Prague to Laun on the Eger, hence to Kommotau, passes the range by the pass of Basberg, and descends to Chemnitz. The fourth road runs along the Eger from Saatz to Kaaden, traverses the range by the pass of Pressnitz, and thence leads to Annaberg and Chemnitz. The fifth road leaves the valley of the Eger near Kaaden, passes the range near Gottesgab, and leads through Schneeberg to Zwickau. The sixth and most western road runs from Carlsbad to Joachimsthal, and thence over the range through Johann-Georgenstadt and Schneeberg to Zwickau.

ESCALLONIA′CEÆ, a small natural order of exogenous plants, related to the genus Ribes, in the opinion of some, but to that of Saxifraga, according to other botanists. It consists of shrubs with evergreen leaves, which often emit a powerful odour like that of melilot; their flowers are red or white, and often are quasimonopetalous, in consequence of the approximation of their petals. They have an inferior many-seeded ovary, with two large placentæ in the axis, a definite number of epigynous stamens, a single style, and minute chaffy seeds with a very small embryo lying in oily albumen. All the species inhabit South America, on the mountains, especially in alpine regions. Escallonia rubra, montevidensis, illinita, and others, have now become common in warm sheltered gardens in this country.



Esculleria Serrata.

1. A flower magnified, without the petals; 2, a transverse section of the ovary.

ESCAPEMENT. [HOROLOGY.]

ESCARP, or SCARP, in fortification, is that side of the ditch surrounding or in front of a work, and forming the exterior of the rampart. In field-works the escarp is usually formed by cutting the earth at such an inclination as will permit it to support itself, which may be at 45 degrees with the horizon or more, according to the tenacity of the soil; and, to impede the enemy in attempting an assault, fraises or inclined palisades are frequently planted on the slope. In large fortresses the escarp is the exterior surface of the revetment wall which supports the rampart, and it is frequently formed at such an inclination that its base, measured in front of a vertical plane passing through the top of the wall and in the direction of its length, is one-sixth of the height of the wall; but engineers at present recommend both the escarps and counterscarps to be vertical, from an opinion that the action of the weather upon the brick-work will thereby be diminished. [REVETMENT.]

ESCARPMENT, a precipitous side of any hill or rock. In military operations ground is frequently scarped, as it is called, or cut away nearly vertically about a position, in order to prevent an enemy from arriving at the latter. Part of the rock of Gibraltar has been rendered inaccessible in this manner; and, in the execution of the intrenchments about Lisbon, in 1810, the British troops formed an escarpment from 15 to 20 feet high, and about two miles long, on the brow of a ridge of heights extending from Alhandra to the valley of Calandrix, in order to secure the line against an attack at that part. A similar work was executed along a ridge of hills between Mafra and the mouth of the S. Lorenzo.

ESCHARA. [POLYPARIA MEMBRANACEA.]

ESCHAROTICS (ἐσχαρωτικά, from ἐσχαρόω, to form a crust, or scab), are agents applied to the surface of the body, which destroy the vitality of the part which they touch and produce an eschar. This effect they occasion either by combining chemically with the animal matter, or by destroying the old affinities, and causing the elements of the part to enter into new combinations. Their action is more energetic in proportion to the degree of vitality of the part to which they are applied. They are classed under two heads, the *potential* cauterants, and the *actual* cautery: the former are chiefly chemical agents, and form new compounds with the elements of the part with which they come in contact; but some merely cause irritation and augmented absorption, and are distinguished as *erodents*. The actual cauterants are substances of an elevated temperature, which decompose the part which they touch, and completely destroy its organization.

The chief potential cauterants are strong mineral acids, such as the sulphuric or nitric, pure alkalies, and some metallic salts, especially nitrate of silver or lunar caustic. These are used either to produce counter-irritation, or to remove fungous or morbid growths. Lunar caustic seems to possess peculiar properties, and is unquestionably the most powerful *direct* antiphlogistic agent known. If applied in the solid state to many inflamed parts it speedily checks the morbid action, and is decidedly the best application to chilblains, and in leucorrhœa. The actual cauterants are used either for their primary action, viz., the immediate destruction of the part, or for their secondary effects. The former object is rarely attempted, except to prevent the absorption of any poisonous or contagious matter, such as the venom of a snake, or bite of a mad dog. The secondary effects are more important, and more varied according to the degree of heat of the substance applied. The first effect is pain more or less severe, a flow of blood towards the part, and more rapid performance of the process of interstitial deposition and absorption, terminating in inflammation, extending to a greater or less depth, according to the intensity of the heat, or form of the body employed. This increased action has often a salutary effect, which is frequently felt through the whole frame. Torpor and paralysis of the nervous system often disappear, and neuralgia both of the neighbouring and even distant parts is removed. Atony and laxity of the muscular system vanish, and every part displays more energy and power.

The actual cautery may be applied in a variety of ways, viz., hot water, hot vapour, moxa, and heated iron. The first of these is a very ready means of causing vesications in some diseases. In phthisis pulmonalis, or consumption, where pain is often more relieved by vesication than any other means, placing a sponge in a wine-glass, and pouring boiling water on it, then suddenly inverting the glass over the part of the chest where the pain is felt, will cause immediate vesication, followed by speedy relief. The vapour of boiling water, as it issues from the spout of a kettle, is also a convenient method of applying heat in inflammations of the joints, as in gout, morbus coxarius, and other deep-seated diseases of the bones. As the red-hot iron is now seldom used, being confined to veterinary medicine, moxa affords the best substitute, and it is very convenient, as any degree of intensity or rapidity of action can be given to it. [MOXA.]

The eschar which follows the application of the potential or actual cautery generally separates in a few days. The ulcer is then to be treated with different agents, according as it is wished to heal it or keep it open, as a farther means of counter-irritation.

ESCHEAT, from the Norman French word *eschet* or *echet*, chance or accident (a word derived from *escheoir*, the old French form of the verb *échoir*, 'to fall'), is defined by Sir William Blackstone as an obstruction to the course of descent by some unforeseen contingency which consequently determines the tenure. In this case the land results back by a kind of reversion to the original grantor or lord of whom it is holden.

Escheat takes place when the tenant of lands dies intestate and without an heir: in such case the lands, if freehold, escheat to the king, or other lord of the fee; if copyhold, to the lord of the manor. Lands which have descended to the last tenant from a paternal or maternal ancestor, escheat, if there are no heirs on the part of that ancestor from whom the lands descended. Since the 1st day of January, 1834, there can be no escheat on failure of the whole blood, wherever there are persons of the half-blood capable of inheriting under 3 & 4 Will. IV., c. 106.

If a bastard dies intestate and without issue, his lands escheat to the lord of whom they are held.

Escheat also takes place upon attainder for treason and murder, by means of which the blood is in law considered to be corrupted, and the attainted owner of lands rendered incapable of holding them himself, or transferring them by descent. In consequence of this extinction of heritable blood, the lands of such felons revest in the lord, except in cases of treason, when a superior law intervenes, and they become forfeited to the crown. Previously to a recent act (3 & 4 William IV., c. 106), a person could not trace his descent through another person who had been attainted; but this may now be done, provided that other person shall have died before such descent shall have taken place. [ATTAINDER.] And by the 4 & 5 William IV., c. 23, no property vested in any trustee or mortgagee shall escheat or be forfeited by reason of the attainder or conviction for any offence of such trustee or mortgagee, except so far as such trustee or mortgagee may have a beneficial interest in such property.

This doctrine of escheat consequent upon the commission of certain crimes is derived from the feudal law, by which a vassal was only permitted to hold real property upon condition of well demeaning himself.

The doctrine of escheats, with regard to extinct successions, seems to have been adopted in every civilized country to avoid the confusion which would otherwise arise from the circumstance of any property becoming common; and the sovereign power, or those who claim under it, are consequently the ultimate heirs to every inheritance to which no other title can be found.

ESCHEATOR, an antient officer appointed by the lord treasurer, and so called because his office was to look after escheats, wardships, and other casualties belonging to the crown.

There were at first only two escheators throughout England, one on this side and the other beyond the Trent; but in the reign of King Edward III. there was one appointed for every county, who was to continue in office for one year only. This office has now ceased to exist. (Blackstone's *Commentaries;* Wooddesson's *Lectures.*)

ESCHSCHO'LTZIA, a genus of beautiful yellow-flowered papaveraceous plants, inhabiting California and the north-western coast of North America, and now become extremely common in the gardens of Great Britain. They are known by the base of their calyx remaining at the base of the siliquose fruit in the form of a firm fleshy rim, by their calyx being thrown off like a calyptra when the petals unfold, and by the stamens being inserted into the edge of the permanent rim of the calyx. Otherwise they are very near our sea-shore Glaucium. Two certain species only, *E. Californica* and *E. crocea*, have yet been introduced; a third, *E. compacta*, is figured in the 'Botanical Register,' but it is probably a mule between the two first. It has been recently proposed to alter this name, which has a barbarous sound and appearance, for the more harmonious one of Chryseis, and it is hardly to be doubted that the latter will be adopted. (*Botanical Register*, t. 1948.)

ESCHWEGE. [HESSE, LOWER.]

ESCUAGE, or **SCUTAGE**, a pecuniary payment, by way of commutation for knight-service, whereby the tenant was bound to follow his lord into the wars at his own charge. The term escuage or scutage is from the old French *escu*, and that from the Latin *scutum*, 'a shield;' a name also given to coins on which there was the shield or escutcheon of the sovereign.

The personal attendance in knight-service growing troublesome and inconvenient in many respects, the tenants found means of compounding for it, by first sending others in their stead, and in process of time by making a pecuniary satisfaction to the lords in lieu of it. This pecuniary satisfaction at last came to be levied by assessments, at so much for every knight's fee; and therefore this kind of tenure was called *scutagium* in Latin, or *servitium scuti;* as being a pecuniary substitute for personal service. The first time this appears to have been taken was in the 5th Hen. II., on account of his expedition to Toulouse; but it soon came to be so universal, that personal attendance fell into disuse. Hence we find in our antient histories that, from this period, when our kings went to war, they levied scutages on their tenants, that is, on all the landholders of the kingdom, to defray their expenses, and to hire troops: and these assessments, in the time of Henry II., seem to have been made arbitrarily and at the king's pleasure. This prerogative being greatly abused by his successors, it became matter of national complaint, and King John was obliged to consent, by his *magna charta* (c. 12), that no scutage should be imposed without consent of parliament. But this clause was omitted in his son Henry III.'s charter; where we only find (c. 37) that scutages or escuage should be taken as they were used to be taken in the time of Henry II.; that is, in a reasonable and moderate manner. Yet afterwards, by statute 25 Edw. I. c. 5 and 6, and many subsequent statutes, it was enacted, that the king should take no aids or tasks but by the common assent of the realm. Hence it is held in our old books, that escuage or scutage could not be levied but by consent of parliament (*Old Ten.* tit. *Escuage*), such scutages being indeed the groundwork of all succeeding subsidies, and of the land-tax of later times. (Jacob's *Law Dictionary*, in voce; Blackstone's *Comment.* vol. ii. pp. 74, 75.)

ESCULA'PIUS. [ÆSCULAPIUS.]

ESCULIC ACID, a peculiar acid procured from horse-chestnuts. This acid is colourless, insoluble in water, but dissolved by alcohol, and is deposited from it in crystalline grains. It forms with bases salts termed *esculates*, but they are quite unimportant. Esculic acid consists of 8·35 hydrogen, 57·26 carbon, and 34·39 oxygen, in 100 parts.

ESCURIAL, or **ESCORIAL**, a vast edifice in the kingdom of Toledo, situated seven leagues from Madrid in a north-west direction. The term escorial is considered by some to be Arabic, meaning a place full of rocks, but by others is derived from *scoria ferri*, iron dross, from the circumstance of there having been antiently great iron works near this place. The situation is rocky and barren, devoid of all vegetable matter, except what has been conveyed there by man; and it appears to have been chosen for the advantage of procuring stone. The edifice was begun by Philip II., five years after the battle of St. Quintin, fought on the anniversary of St. Lawrence (both of which circumstances it was intended to commemorate) and was finished in twenty-two years. This extensive building is laid out, on its ground plan, in the form of a gridiron, a part (which forms the royal residence) advancing to form the handle, attached to a long rectangle forming several courts and quadrangles. This part is 640 by 580 feet, and the average height to the roof is 60 feet. At each angle is a square tower 200 feet high. The plan is divided so as to form a convent with cloisters, two colleges, one for the clergy and one for seculars, the royal palace, three chapter houses, three libraries with about 30,000 volumes and some valuable MSS., five great halls, six dormitories, three halls in the hospital, with twenty-seven other halls for various purposes, nine refectories, and five infirmaries, with apartments for artisans and mechanics. There are no less than eighty staircases. The gardens and parks, formed by art, are decorated with fountains.

The monks of the order of St. Jerome were 200 in number, and had a revenue of 12,000*l.* per annum.

The stone of which the building is constructed is white, with dark grey spots. The windows on the outside are 1110 and within 1578; of the former 200 are placed in the west front and 366 in the east. Including the out-offices, there are not less than 4000 windows. There are fourteen entrances or gateways, which have pretensions to architectural decoration, and 86 fountains.

The church is 374 feet long and 230 broad, and is divided into seven aisles. It is crowned with a dome 330 feet high from the ground, and is paved with black marble. In the church are forty chapels with their altars. In the palace and in the church there is a profusion of gilded bronze work and incrustation of marbles. There are numerous paintings by the great masters in the Escurial. It is possible however that these may have been removed to the Royal Museum at Madrid, formed by the late King Ferdinand. (*Spain Revisited*, cap. 13, vol. i.) The sculpture is said not to have any great merit. Philip IV. added a beautiful mausoleum 36 feet in diameter and incrusted with marbles: the design is in imitation of the Pantheon at Rome. The cost of the Escurial was six millions of piastres. For some curious details of the Escurial see 'The Escurial, or that wonder of the world for architecture and magnificence of structure, &c., translated into English by a servant of the earl of Sandwich in his extraordinary embassie thither,' Lond., 1671. From the title-page it appears that there was a report in 1671 that the Escurial had been destroyed by fire. There was a similar report a few years since.

ESCUTCHEON or **ESCOCHEON**, the heraldic term for the shield, on which, under every variety of shape, arms are emblazoned. The word is derived from the French *écusson*, and that from the Latin *scutum*. The first representation of arms was, no doubt, as an ornament to the shield. The shield afterwards became the appropriate and legitimate instrument for displaying them; hence in sculpture and painting they were never separated; and when shields ceased to be employed, their form remained, and still continues to be the field on which coat-armour is invariably depicted. An *escutcheon of pretence* is the small shield in the centre of his own, on which a man carries the coat of his wife, if she is an heiress and he has issue by her. In this case the surviving issue will bear both coats quarterly.

ESNE. [EGYPT, p. 312.]

ESOTERIC. [EXOTERIC.]

ESPALIER, a trellis for training fruit trees or bushes upon, instead of nailing them to walls.

In certain situations this kind of training is not only extremely neat but possesses peculiar advantages: the trees are more fully exposed to the influence of light, less liable

to be broken by high winds, and in small gardens in particular, where room is of great importance, and where a collection of the finer sorts of fruit is always desirable, it is found highly useful, both on account of the small space which the trees occupy, and because they will bear fruit much sooner than when allowed to grow in their natural form.

In France and other parts of the Continent this kind of training is very much practised, and in the northern parts of England and in Scotland, where the borders of the kitchen-garden are frequently planted with flowers, in order to combine pleasure with utility, espaliers are trained along the back of the flower borders to prevent the vegetables being seen from the walks.

When the espalier is fastened to a wall, as is very common on the Continent, peach and nectarine trees are frequently trained upon it; but where it is detached, as it is most commonly in Britain, apples and pears, and sometimes gooseberries, are the only fruits which are successfully cultivated in this way. Plums and cherries are occasionally so managed, but not so advantageously as the others.

When a common espalier is to be covered, the trees should be planted from 20 to 24 feet apart, which will allow the branches to grow 10 or 12 feet on each side: but as a considerable time would elapse before they would fill this space, a duplicate tree may be planted between each, and cut away as the others grow. Gooseberries of course require a small space; three or four feet from plant to plant is sufficient.

The training on espalier is very simple, and easily performed. When the trees are young, one shoot must be trained perpendicularly, and two others horizontally, one from each side; the two last must not be shortened, but the perpendicular shoot is to be shortened in the following year to three good buds, two of which are to form new side branches, and the other a leader as before; and so on every year until the trees have attained the desired size. The proper distance between the horizontal branches must depend upon the peculiar growth of the tree, but from six to nine inches is what is generally allowed. Trees are sometimes trained upon a double espalier which has the advantage of giving two surfaces to train upon. It consists of two trellises instead of one, about two feet apart at the bottom, and approaching at the top.

The only kind of espalier worth notice, which differs from those now mentioned is a table-rail: this, the management of which is called table training, consists of rails resembling tables, up the centre of which the tree is trained and regularly spread over the surface. It is rarely employed, and has the essential fault of exposing the blossom so much to the effect of nocturnal radiation that in this country a crop is rarely obtained from such espaliers.

The stakes which form the espalier are made of different materials, some of wood, others of wire and wood, and some of cast iron. The first of these is by far the most simple, and is composed of stakes, five or six feet in height, driven into the ground from one to two feet apart; along the top a bar, which is nailed to each, connects the whole together. It is of no use to have the stakes either so strong or so high when the trees are first planted, because they are not required, are unsightly, and will have to be renewed before the trees have attained their intended height; for this reason, stakes of a much weaker kind will at first answer quite as well. The wire and wood rail is formed by strong vertical wires, strained from two wooden horizontal rails, which are connected and held fast by wooden posts let into the ground. The iron rail is constructed upon the same plan as a common street railing.

The objection to all iron trellises is, that they cut and canker the trees; and when the cheapness of the wooden one is considered, besides the more natural appearance which it presents, it must undoubtedly have the preference.

The best wood for this purpose is young larch, the thinning of plantations.

ESPALION, a town in the department of Aveyron, in France. It is on the left or south bank of the river Lot, 17 miles from Rhodez, the capital of the department, and 339 from Paris by Fontainebleau, Briare, Nevers, Moulins, Riom, Clermont, and St. Flour. The principal street of the town is broad, and lined with well-built houses; it leads down to the bridge over the Lot. The population in 1832 was [illegible] for the town, or 3545 for the whole commune. The inhabitants manufacture light woollen stuffs, and there are several tan-yards: morocco leather is manufactured. Good wine is produced in the country round Espalion. The town has a subordinate court of justice (*tribunal de première instance*), a high-school, and a drawing-school.

The arrondissement of Espalion is subdivided into nine cantons or districts, under the jurisdiction of a justice of the peace, and 101 communes: it had in 1832 a population of 65,086.

ESPIRITU SANTO. [BRAZIL, p. 336; CUBA, p. 205.]

ESPRIT, SAINT, a suburb of Bayonne. [BAYONNE.]

ESPLANADE, the ground between the fortifications of a citadel and those of the town to which it belongs. It is recommended by writers on fortification that this space should be about 300 fathoms broad, reckoning from the covered way of the citadel, that in the event of an attack on the latter the enemy may not construct batteries within breaching distance under the cover afforded by the buildings of the town.

ESQUILINE HILL. [ROME.]

ESQUIMAUX, a nation inhabiting the most northern countries of America, and, if the extent of country be considered, one of the most widely-spread nations on the globe. On the eastern coast of America they are met with as far south as 50° N. lat. on the shores of the Strait of Belle Isle, which separates Newfoundland from the mainland of America. They occupy the whole of the great peninsula of Labrador and the whole eastern coast of Hudson's Bay up to East Main River. On the western side of Hudson's Bay they inhabit the coast north of Churchill River, whence they extend northwards over the Barren Lands to the Great Fish River, or Thleweechodezeth, on both banks of which river they are found east of 100° E. long. The whole country between this river, the Great Bear Lake, the Mackenzie River, and the Arctic Ocean, is exclusively inhabited by them. The coast lying to the west of Mackenzie River is also in their possession; and they seem to be spread as far as Kotzebue Sound, on Behring's Straits. They also occupy Greenland and all the other islands between the northern coast of America and the pole, as far as they are habitable.

In stature the Esquimaux are inferior to the generality of Europeans. A person is rarely seen who exceeds 5 feet in height. Their faces are broad, and approach more to the rounded form than those of Europeans; their cheek-bones are high, their cheeks round and plump, mouth large, and lips thick. The nose is small, and, according to some authors, flat, which, however, is denied by others. Their eyes are in general of a deep black; but some are of a dark chestnut colour; they appear very small and deeply seated, owing to the eye-lids being much encumbered with fat. The hair is uniformly long, lank, and of a jet black colour. The ears are situated far back on the head. Their bodies are large, square, and robust, the chest high, and shoulders very broad. Their hands and feet are remarkably small; there is, however, no sudden diminution, both extremities appearing to taper from above downwards in a wedge-like shape. Graah, in his 'Voyage to Greenland,' observes that the inhabitants of the eastern coast have disproportionately large hands and feet. They are of a deep tawny or rather copper-coloured complexion. They are not without beard, as it has been asserted, but they pluck it out as soon as it appears. Some of them even wear long beards. They show a good deal of ingenuity in making their dresses and instruments; and some of them have attracted the attention of our travellers by their display of mental powers.

Their language is different from that spoken by the other savage nations who inhabit North America; but it seems that the same language is spoken by all the different tribes of the Esquimaux, though of course each of them has expressions which are peculiar. (Parry; Mac Keevor; Graah's *Voyage to Greenland*.)

ESQUIRE (from the French, *écuier*, or shield bearer) is the next title of dignity to that of knight. The esquire was the second in rank of the [illegible] to chivalry, or knighthood, and had his name from carrying the shield of the knight, whose bachelor, or apprentice in arms, he was. The gradations of this service, or apprenticeship to arms, were, page, esquire or bachelor, and knight, who, in his turn, after the formation of degrees of knighthood, was called a knight bachelor, as aspiring to the higher honours of chivalry. The esquire was a gentleman, and had the right of bearing arms on his escutcheon or shield; he had

also the right of bearing a sword, which denoted nobility or chivalry, though it was not girded by the knightly belt; he had also a particular species of defensive armour which was distinguished from the full panoply of the knight. So much for the esquire of chivalry, which order is only preserved in the almost obsolete esquires for the king's body, whom antiquaries have pronounced to be the king's esquires in chivalry (that is, his esquires, as being a knight), and in the esquires of knights of the Bath.

There was also another class, who may be called feudal esquires, and consisted of those tenants by knight's service who had a right to claim knighthood, but had never been dubbed. They were in Germany called *ritters*, or knights, but were distinguished from the actual knights, who were called dubbed knights, or *Ritter Geschlagen*, and had many of the privileges of knighthood. This distinction still exists in many of the countries which formed part of the German empire. In Hainault, Brabant, and other provinces of what was Austrian Flanders, the antient untitled nobility, or gentry as they are called in England, to this day are styled collectively the *Ordre Equestre*, or knightly order. It also existed in England until James the First had prostituted the honour of knighthood, for Camden frequently speaks of knightly families (*familias equestres*, or *familias ordinis equestris*), where the heads of them were not, at the time, actual knights. Writers on precedence make mention of esquires by creation, with investiture of a silver collar or chain of *ss*, and silver spurs: but these seem to have been only the insignia of the esquires for the king's body, which being preserved in a family as heir looms, descended with the title of esquire to the eldest sons in succession. The sons of younger sons of dukes and marquesses, the younger sons of earls, viscounts, and barons, and their eldest sons, with the eldest sons of baronets, and of knights of all the orders, are all said to be esquires by birth, though their precedence, which differs widely, is regulated by the rank of their respective ancestors. Officers of the king's court and household, and of his navy and army, down to the captain inclusive, doctors of law, barristers, and physicians, are reputed esquires. A justice of the peace is only an esquire during the time that he is in the commission of the peace, but a sheriff of a county is an esquire for life. The general assumption of this title by those who are not, in strictness, entitled to it, has virtually destroyed it as a distinct title or dignity. The heads of many old families are, however, still deemed esquires by prescription.

ESSAYISTS, BRITISH. This title is customarily confined to a certain class of periodical writers upon subjects of general interest, as morals, criticism, manners, &c. The notion of a series of papers fit for general circulation, and not including news or politics, was originated by Steele and Addison in the 'Tatler.' [ADDISON.] The 'Freeholder,' 'Craftsman,' 'Freethinker,' &c., now almost forgotten, were rather political pamphlets than essays in this sense of the word; and an interval of thirty-five years elapsed from the end of the 'Spectator' to the successful revival of this style of writing by Dr. Johnson, in the 'Rambler,' in 1750. Its great popularity led to the establishment of a number of similar periodicals during the latter half of the eighteenth century, since which time they have again gone out of fashion. We give a list of those contained in Alexander Chalmers's collective edition of British Essayists, which includes some that have little claim to a place among the standard works of our language; with the names of the principal and most celebrated contributors to each.

'Tatler'—Steele, Addison.
'Spectator'—Addison, Steele, Budgell, Pope, &c.
'Guardian'—Steele, Addison, Berkeley, Pope, Tickell, Gay, &c.
'Rambler'—Johnson, almost entirely.
'Adventurer'—Hawkesworth, Johnson, Jos. Warton, &c.
'World'—Moore, Lord Chesterfield, Horace Walpole, J. Warton, &c.
'Connoisseur'—G. Colman and Bonnel Thornton chiefly; Cowper a few.
'Idler'—Johnson; a few by Warton and others.
'Mirror'—Henry Mackenzie and others.
'Lounger'—The same.
'Observer'—Richard Cumberland, almost entirely.
'Olla Podrida'—Moore, &c.
'Microcosm'—Canning, Frere, Smith, &c.

ESSEK, ESZEK, ESSEG, or OSZEK, the chief town of the circle of Essek, and the capital of Austrian Sclavonia, is a royal free town situated in a level and marshy district on the right bank of the Drave, a little to the west of its efflux into the Danube. It lies in 45° 34′ N. lat., and 18° 42′ E. long. Its site is that of the Mursia, or Mursa of the Romans, which was founded in the year 125 by the emperor Hadrian, and afterwards became the residence of the Roman governors of Lower Pannonia. Constantine made it the seat of a bishopric in the year 335. It now consists of four quarters; the present fortress, begun under the emperor Leopold I. in 1712, and finished in 1719, is well built, contains 147 handsome and lofty houses, an arsenal and barrack, and is regularly fortified: an esplanade runs round it, and to the north-west of it stands the Felso-Varos (Upper Town), which is approached by an avenue 1100 paces long, is the residence of the merchants and dealers, and has well-attended fairs. South-east of the fortress lies the Also-Varos, or Lower Town, the site of the antient Mursa, which consists of broad and handsome streets, and has some fine churches; and in the east is the New Town, composed rather of farms and gardens than of lines of streets. The fortress and suburbs contain altogether about 1800 houses, 5 Roman Catholic churches, 4 chapels, and a church for those of the Greek persuasion, and 11,200 inhabitants. There are several handsome buildings, such as the town-hall, the house of assembly for the states of Verócz, the county in which Essek is situated, the barracks, engineers' house, officers' pavilion, and arsenal. Essek has a Roman Catholic high-school, a gymnasium, a Greek school, a military cadet academy, and a Franciscan and a Capuchin monastery. A causeway or bridge about two miles and a half in length, 55 feet in breadth, and 9 feet in height, constructed in the year 1712, leads across the Drave and the swamps on its northern bank into the Hungarian county of Baranya. With the exception of some silk-spinning there is little mechanical industry in the town. There is a considerable trade in grain, cattle, and raw hides.

ESSEN, a township in the Prussian administrative circle of Düsseldorf, consisting of the town of Essen only, which lies on the Berne, in 51° 27′ N. lat., and 7° 2′ E. long. It was the spot where the foreign princes of the Rhine and of Westphalia formerly held their diets, or 'Fürstentage.' Essen is surrounded by walls, has about 830 houses, and the population, which was 4706 in the year 1817, is now about 5700. It is the seat of mining and crown-domain boards, and has 2 Protestant and 2 Roman Catholic churches, a gymnasium, a Capuchin monastery, a Protestant orphan asylum, and a hospital. The chapel of St. Quirinus is supposed to be the first place of Christian worship erected in these parts. The manufactures consist of woollens, linens, vitriol, leather, arms, iron and steel ware, &c. The town has some trade, and there are coal-mines in the vicinity, as well as a number of iron works.

ESSENCE is derived from the Latin *essentia*, a word which is used by Cicero and Quinctilian, and formed, not as stated in Mr. Richardson's Dictionary, from *existentia*, but from *essens*, the analogous but obsolete participle of the verb *esse*, to be. The English word essence consequently signifies that which constitutes the being of a thing, or, in the words of Locke, that which makes it to be what it is. This term was the subject of many very subtle disquisitions and disputes among the scholastic logicians of the fourteenth, fifteenth, and sixteenth centuries; and the metaphysical notions of essence entertained by these logical doctors cannot be understood without reference to their discussions respecting the nature of universal ideas, as real or nominal, of abstraction, genus, species, differentia, substance, properties, accidents, &c., of all which particulars may be found in Smiglecii Logic. Disputat.; Burgersdicii Logica: Eustachii Logica; Le Grand, Institut. Logic.; Wallisii Logica; and in many other logical and philosophical treatises cited in Johnson's Quæstiones Philosophicæ, p. 168, &c. Some amusing instances of metaphysical sagacity concerning logical essence are exhibited in the scholastic work of Louis de Lesclache, 'La Philosophie, divisée en cinque Parties,' 1548. 'Il n'y a rien dans la substance qui ait moins d'essence que la substance; aussi il n'y a rien dans la substance qui soit moins substance que la substance,' &c. In the Oxford Manual of Scholastic Logic, by Dr. Aldrich, as expounded by Mr Huyshe, it is taught, in accordance with the theory of the Nominalists, that essence is not really existent, but is merely a figment of imagination, and that the notion of it is resolvable into two parts; that which is common to other

essences being called the *genus*, and that which is peculiar to one particular essence, distinguishing it from all others and constituting it what it is, being called the *differentia*. The whole essence is called the species; that is, genus + differentia = species. The qualities joined to essence are also of two kinds; those which are joined necessarily are called *properties*, and those which are joined only contingently are called *accidents*. Hence the five predicables, or only possible parts of a thing which can be the objects of assertion:—1. Species or whole essence. 2. Genus, the common or material part of the essence. 3. Differentia, the peculiar or formal part of the essence. 4. Property or quality, necessarily joined to the essence. 5. Accident, or quality contingently joined to the essence. The following statements, collected from Locke (*Essay*, book iii., c. 3 and 6), exhibit the principal points of his doctrine of essence. He considers essence to be of two kinds: 1. The real essence, which constitutes the insensible parts of a thing, and is wholly unknown to us. 2. The nominal essence, which depends on that which is real, and is the complex idea, for instance, of the properties of colour, weight, malleability, fixedness, fusibility, &c., expressed by the word gold; for nothing can be gold which has not the qualities conceived in the abstract idea to which this name is applied. In simple ideas (see book ii. c. 2), the real and nominal essence are identical, but in substances they are always different. Each of the distinct abstract ideas which men make and settle in their minds by giving them names is a distinct essence; and the names which stand for such distinct ideas are the names of things essentially different. Thus, a circle is as essentially different from an oval as a sheep from a goat; the abstract idea which is the essence of one being impossible to be communicated to the other. As essences are nothing but the abstract complex ideas to each of which has been annexed a distinct and general name, and as of such ideas there are some which correspond to no reality in nature—for instance, those of mermaids, unicorns, &c.—it is evident that there are essences of things which have no existence. In considering essence with regard to the scholastic theory of genus and species, Locke observes that we classify things by their nominal essences, having no other measure of essence and species but our abstract general ideas or mental archetypes, without reference to which we cannot intelligibly speak of essential and specific difference. The doctrine of the immutability and ingenerable incorruptible nature of essences can be founded, says Locke, only on the relation between abstract ideas and the sounds by which they are signified; that is, on the fact that the same name retains the same signification, and also on the fact that, whatever may become of individuals, as Alexander and Bucephalus, the ideas of man and horse remain unaltered. Some of these positions, as that real essences are unknown, and that species are distinguished by essences merely nominal, are disputed in Green's Philosophy and Lee's work against Locke. (See also many of the earlier scholastics; and for an exposition of the doctrine of essence, according to the transcendental theory, see Kant's 'Kritik der reinen Vernunft' and Wirgman's Logic and Metaphysics, in the 'Encyclopædia Londinensis.') Substance, as distinguished from essence, is understood to mean all the essential, with the accidental qualities; and essence (genus and differentia, or common and proper) the essential qualities alone, that is, the pure substance, or metaphysical substratum. The Greek word *ousia* (*οὐσία*) has many significations applicable to the individual, genus, species, and subject (Aristotle, *Metaphys.* l. 6, c. 3); on which it is remarked by Roy Collard (*Essai sur la Psychologie*, 1826, p. 149. 246), that while the Latin and all modern languages have two distinct expressions for essence and substance, it is surprising that the Greek, which is otherwise so rich, had only one name (*οὐσία*) for these two ideas. The word *ὑπόστασις*, *hypostasis* (substance), was subsequently employed, but with similar duplicity and confusion. Hence arose many of the Trinitarian controversies, or rather logomachies, which embroiled the first ages of the church; for Athanasius, Epiphanius, and most of the other Greek fathers understood *πρόσωπον*, person or mode of being, as meaning the same thing as *ὑπόστασις*, substance; and Sabellius, Arius, Nestorius, and Eutyches understood *ὑπόστασις* as signifying the same thing as *οὐσία*, that is, essence or nature. So that Sabellius said, there is one essence or nature in God, *therefore* one substance or person. There are three substances or persons in God, said Arius, *therefore* three essences or natures. There are two essences or natures in Christ, said Nestorius, *therefore* two substances or persons. There is but one substance or person in Christ, said Eutyches, *therefore* but one essence or nature. The essay on the difference between *οὐσία* and *ὑπόστασις*, essence and substance, which is often attributed to St. Gregory, appears to belong rather to St. Basil; at least it is contained in his 43rd epistle. The epithet *essential* denotes those indispensable qualities in a thing, without which it could not be what it is; and the name *essentials*, as the essentials of logic, signifies those parts alone which are valid for general or particular uses.

ESSENES. [HESSENES.]

ESSEQUIBO. [GUIANA, BRITISH.]

ESSEX, an English county, situated on the eastern coast of the island of Great Britain. It is of irregular form, approximating to the quadrant of a circle, of which the north-western point of the county may be considered as the centre; the southern, south-eastern, and eastern sides a portion of the circumference; and the northern and western sides the circumscribing radii. It is bounded on the north by the county of Suffolk (from which it is separated by the river Stour) and by the county of Cambridge (from which it is separated for a very short distance by the river Cam); on the west by the county of Herts (from which it is separated, along a part of the boundary-line, by the river Stort, a feeder of the Lea, and by the river Lea); and by the county of Middlesex (from which it is separated throughout by the Lea, which joins the Thames at the south-western extremity of the county); on the south side and on a portion of the south-east side it is bounded by the gradually widening æstuary of the Thames, by which it is separated from the county of Kent; and on the remainder of the south-east side and on the east side by the German Ocean. The length of a straight line drawn from the north-western to the north-eastern extremity of the county, is 53 miles; but the northern boundary of the county, following its turnings, is about 75 miles; the length of a line joining the north-western with the south-western extremity, is 37 miles; but the boundary-line, from its many windings, extends to 53 miles. The length of a line joining the south-western to the north-eastern extremity of the county (which would be the chord of the circumscribing arc of the quadrant) is 63 miles; but the boundary along the bank of the Thames and the coast of the ocean is about 85 miles. The area of the county is estimated at 1533 square miles; or, taking the estimated areas of the several parishes, 979,000 acres. The population, according to the return of 1831, was 317,507, giving 207 to a square mile. In magnitude it is the tenth of the English counties, being a little smaller than Kent, and a little larger than Suffolk. In absolute population it is the thirteenth, and in relative population the eighteenth, of the English counties. Chelmsford, the county-town, is on the river Chelmer, 29 miles from St. Paul's, London, in a straight line north-east by east; and the same distance from Whitechapel Church, London, by the road through Romford, Brentwood, and Ingatestone. (*Ordnance Survey.*)

Coast, Islands, &c.—The bank of the Thames and the sea-coast of Essex are marshy almost throughout. From the junction of the Lea with the Thames to Purfleet, 11 or 12 miles, the marshes extend from a mile to a mile and a half or even two miles inland, and the river is confined to its bed by an embankment. At Purfleet the hills come down to the river; and from Purfleet to Grays Thurrock, 5 miles, the marshes consist only of a very narrow strip along the river-bank; the embankment is, however, carried on, except just at Purfleet. West and East Tilbury marshes, on each side of Tilbury Fort, extend 6 miles along the river, and from one to two miles inland; but below them the breadth of the marsh land is again contracted, along that bend of the river called The Hope, 3 miles long, from the lower end of which they again widen, and extend above 9 miles along the river, and nearly 4 miles inland, being intersected by an inlet called Hole Haven, the branches of which cut off from the mainland the low marshy Isle of Canvey. The embankment of the river is carried round the inlet of Hole Haven, along the bank of the creek which separates Canvey Island from the main, and round the whole of Canvey Island; those portions of the marsh-land which are not comprehended within the embankment are, below Tilbury Fort, salt marshes. From the eastern end of Canvey Island the marshes cease; and about Leigh

and Southend the coast rises into low cliffs. At Shoebury Ness, a low point of land at the mouth of the Thames, 6 miles from the east end of Canvey Island, where the coast turns to the north-east, the marshes reappear; and with an interval of about a mile just beyond Shoebury, they continue along the coast 11 miles to the mouth of the river Crouch. Nearly 4 miles from Shoebury a narrow creek, with many ramifications, penetrates inland into the channel of the river Crouch, and with that river cuts off from the mainland several low flat islands, Russelys, Haven Gore, New England, Potten, Wallasea, and Foulness. The edge of this creek and its various ramifications, as well as of the Broomhill and Crouch rivers, which unite with it, are embanked, and the islands are embanked all round. The marshy tract, including the islands and the adjacent part of the mainland, is from 3 to nearly 6 miles broad; and the sand (Foulness Sand), dry at low water, which at Shoebury Ness was a mile and a quarter broad (having widened from a quarter of a mile at Hole Haven), is off Foulness Island 4 miles broad; there is a road along this sand from Kennet's Head, near Shoebury, almost to the north-eastern end of Foulness Island. From the mouth of the Crouch the coast runs nearly north and south 8 miles to the mouth of the Blackwater river. In this part of the coast the sea encroaches upon the land. The marshes (Burnham Marsh, Southminster Marsh, Dengey Marsh, Tillingham Marsh, and Bradwell Marsh) extend in the southern parts nearly 5 miles inland, but gradually become narrow to the northward to St. Peter's Chapel, where they are interrupted by the higher ground running down to the coast; the sand, which is dry at low water, has a breadth of from two miles to two miles and a half. Between the æstuaries of the Blackwater and the Colne, in the inlet formed by their junction, the mouth of which inlet, from St. Peter's Chapel to St. Osyth Point, is above 5 miles over, is the island of Mersey, separated from the main by a marshy tract and an intervening narrow channel. The outer or seaward shore of this island is skirted by a very narrow tract of marsh-land; but the marshes about St. Osyth Point are from three-quarters of a mile to a mile broad. The marshes, however, terminate 4 miles beyond St. Osyth's Point, and (with a slight interruption of a mile of marsh-land near the mouth of Holland Creek) a high broken coast extends between 9 and 10 miles to the Naze, the most eastern point of the county. This point formerly extended much farther toward the east. The ruins of buildings have been found at considerable distances from land; and a shoal called West Rock is 5 miles from shore. From the Naze to Harwich, between 5 and 6 miles in a direct line north and south, the coast forms an inlet lined by salt marshes, and occupied by Horsey Island, Holmes Island, Pewit Island, and one or two smaller islands. The sea-coast terminates at Harwich; but the æstuary of the Stour, which is in most parts more than a mile wide at high water, extends up to Catawade Bridge, above Manningtree. (*Ordnance Survey.*)

The islands have been named in the course of the foregoing description of the coast: we subjoin a few particulars of the chief of them.

Canvey Island is bounded on the south-west and west by Hole Haven, and on the north by a narrow creek, which separates it from the mainland. It is entirely marsh-land, banked in all round. Its extreme length from east to west is 6 miles; its greatest breadth from north to south 2½. Its area is estimated at more than 2600 acres (*Lib. of Useful Knowledge: Geography*), chiefly appropriated to grazing sheep and cattle; or 3600 acres (Morant's *Hist. of Essex*). It is connected with the mainland by a causeway leading to the village of South Benfleet. It does not form a distinct parish, but pays tithes and rates to several parishes. From its being comprehended in so many parishes, its population cannot be ascertained from the population returns; but the 'Clerical Guide' (A.D. 1836) assigns to it a population of 216. Morant, in his 'History of Essex,' states that there were then (A.D. 1768) fifty dwellings in the island. In 1622, the land being subject to be overflowed at high water in the spring tides, the owners of lands in it entered into an agreement with Joas Croppenburgh, a Dutchman, for 'inning and recovering the island,' as Morant terms it. A timber chapel was built for the use of the Dutchmen employed in the work. This chapel has been twice rebuilt: the present chapel will hold 100 persons. The value of the perpetual curacy, to which several endowments are attached, is 58*l.*; it is in the gift of the bishop of London. There is a yearly [illegible] island.

Foulness Island (so called from the Saxon Fugel, a fowl, and næse, a promontory, 'the Promontory of Fowls') is bounded on the north by the river Crouch, on the east and south-east by the German Ocean, on the west by the Broomhill river, which separates it from Wallasea Island, and on the south-west by a creek which communicates between this river and the sea and separates Foulness from Potten and New England Islands. Its extreme length, from north-east to south-west, is almost 6 miles; its greatest breadth 2½. Its area is given by Morant at 4500 acres, and in the 'Lib. of Useful Knowledge' at 5000; but in the Population Returns, Foulness parish, which does not, so far as we know, comprehend more than the island, is given at 8060 acres, with a population of 630, almost entirely agricultural. The soil is good, the upper part producing corn of every kind, and the lower part pasturage: the only fences are ditches, which are filled at every tide. Fruit-trees thrive ill. The water is brackish; the only fresh water is rain-water. The houses are scattered over the island, upon the different farms; they are all of wood—a material which, from some cause or other, is here liable to rapid decay. The church, also of wood, is situated near the centre of the island; it will hold 300 persons. The living is a rectory, exempt from the archdeacon's jurisdiction, of the yearly value of 300*l.*, with a glebe-house. There is a yearly fair in the island. Beds of oyster and cockle-shells have been found beneath the surface of this island, which renders it probable that it was originally formed by deposits from the sea.

Wallasea, otherwise Wallet or Wallis, so named from the sea-walls which surround it, is bounded on the north by the river Crouch, on the east and south by the Broomhill river, which separates it from Foulness and Potten Islands, and on the west and south-west by Paglesham Creek, which separates it from the mainland. There is a causeway over Paglesham Creek. Its greatest length is, from east to west, 3½ miles; its greatest breadth is 1¼ miles. The water is too salt to be fit for kitchen use, and the inhabitants have to fetch fresh water from the mainland: that in the ponds is so brackish that horses do not thrive till they have been inured to it. The whole island is marsh-land; it is included in several parishes.

Potten Island, Haven Gore, New England, and Russelys or Rushley, belong to the same group as the two foregoing; they are to the south-west of Foulness and to the south of Wallasea. The whole group is in Rochford hundred. In the creeks which surround or separate these islands are fed the small oysters called Wallfleet oysters.

Mersey Island is in an inlet formed by the æstuaries of the Blackwater and the Colne. The name is derived from the Saxon Mere, the sea or a marsh, and ig, an island. It is bounded on the south by the æstuary of the Blackwater river, on the south-east by the German Ocean, on the east by the æstuary of the Colne, and on all other sides by a creek, which, running through the marshes on its north-west side, under the names of Mersey Channel or Pyefleet Channel, separates it from the mainland: a portion of the marsh on the north side of the island is separated from the rest by a channel called Passfleet. The greatest length of the island is, from east-north-east to west-south-west, nearly 5 miles; the breadth varies from one to two miles. The island is divided into the two parishes of East and West Mersey or Mersea, of which the former comprehends an area of 1810 acres, with a population, in 1831, of 300; the latter an area of 3020 acres, with a population of 847: together, 4830 acres and 1147 inhabitants. There is a passage from the island to the mainland over the Mersey Channel, dry at low water, called 'the Strode' or 'Stroude,' i. e., a bank along the side of a creek, river, or sea. The history and antiquities of this island will be noticed with those of the county at large.

Horsey Island is in that inlet which occurs between the Naze and Harwich. Its greatest length is from north-west to south-east about two miles: its greatest breadth rather more than a mile. It consists almost entirely of salt marshes: a spot rather more elevated than the rest, about one-fourth of the whole, on the south-west side of the island, is banked in. In the marshes there is a decoy for wild fowl.

Pewit Island and Holmes Island, with one or two others are near Horsey: all these islands are separated from each other and from the main by narrow channels.

Surface, Hydrography, Communications. This county has few hills of any considerable elevation: its general slope, as determined by the watershed, is towards the south and

east; the coast and the banks of the Thames present a succession of unhealthy marshes commonly known as the hundreds of Essex. High Beach, on the north-west side of Epping Forest, near Waltham Abbey (390 feet high), Langdon hill, south of Billericay (620 feet high), Danbury hill, between Chelmsford and Maldon, of nearly the same height, and Tiptrey Heath near Witham, are probably the highest parts of the county. The Chalk downs which form the continuation of the Chiltern hills just cross the north-western part of the county in their extension towards the north-east.

The rivers of Essex are—the Thames with its affluents, the Lea (into which flows the Stort), the Roding, the Bourne Brook, the Ingerburn, and some smaller streams; the Crouch with its affluent the Broom-hill; the Blackwater with its affluents the Pods Brook or Witham river; and the Chelmer (into which flow the Sandon Brook, the Ter, and some other streams); the Colne with its affluent the Roman; the Stour; and the Granta or Cam.

The Thames bounds the county on the south side. Its course, though winding, is on the whole nearly from west to east. It is a tide river, and navigable for the largest merchant ships (that is, for East Indiamen of the first class, 1400 tons burden), and for frigates and other smaller ships of war throughout that part of its course which belongs to this county. The mouth of the Thames contains numerous shoals.

The Lea bounds the county on part of its west side. It more properly belongs to Hertfordshire, in which it has a considerable part of its course. It meets the border of Essex at the point where it receives the Stort, along which the boundary previously runs and flows south past Broxbourn (Herts), Waltham Abbey, Chingford, Layton, and Stratford (all in Essex), 20 miles, into the Thames. The banks of this river are marshy; and the marshes are from half a mile to a mile wide. The stream is frequently divided and flows in several channels, and in some places cuts have been made in order to improve or shorten the navigation, which comprehends all that part of the river connected with this county. Some of the acts of parliament relating to the navigation of this river are above 400 years old.

The Stort rises in Hertfordshire, but soon enters Essex, through which it flows for some miles, and then touches the border again, and flows sometimes on the border, sometimes in Hertfordshire, into the Lea. Its whole course is about 24 miles, for about 10 miles of which it has been made navigable. The navigation of the Stort and the Lea serves for the conveyance of corn, malt, wool, and other agricultural produce to London; and for the conveyance in return of coals, timber, deals, bricks, paving stones, groceries, cloth, and other articles of daily consumption.

The Roding rises in the western part of the county, near Easton Park, a short distance north-west of Dunmow: it flows southward about 15 miles to the neighbourhood of Chipping Ongar, where it receives the Cripsey Brook (about 9 miles long) from the north-west. From the junction of the Cripsey Brook, the Roding flows south-west in a very winding channel 14 miles past Kelvedon Hatch, Navestock, Abidge, Loughton, and Chigwell, to Woodford bridge: and from Woodford bridge it flows about 7 or 8 miles south and south by east past Ilford and Barking into the Thames. Its whole course is about 36 or 37 miles. The banks are low and marshy from the neighbourhood of Ongar. The west bank, from Ilford, and both banks from below Barking, are protected by embankments. It is navigable under the name of Barking Creek up to Ilford bridge, and serves to convey coals and other articles for the supply of Romford and the neighbourhood.

The Bourne Brook rises between the villages of Navestock and Havering-atte-Bower, and flows in a winding channel past Romford (below which it receives a small brook from Hornchurch), and between Dagenham and Hornchurch Marshes into the Thames. Its length is about 12 miles. In the lower part of its course the Bourne Brook is connected with the pool formed by Dagenham Breach. This breach was occasioned in 1707 by the blowing up of a small sluice that had been made for the drainage of the land waters: an opening was formed by the rushing in of the Thames, 300 feet wide, and in some places 20 feet deep: 1000 acres of rich land in the adjacent levels were overflowed, and the surface of nearly 120 acres was washed into the Thames, where a bank was formed nearly a mile in length, and extending halfway across the river. After various ineffectual attempts, the breach (which in course of time had been, by the force of the reflux every turn of the tide, worn into several channels like the arms of a river) was stopped, by driving dove-tailed piles and other expedients, under the direction of Captain Perry, who commenced his works in 1718. Within the embankment there is yet a pool of between 40 and 50 acres, where the soil was carried away by the tide. [BARKING.] Through the upper part of this pool the Bourne Brook flows.

The Ingerburn rises near Havering-atte-Bower, not far from the source of the Bourne Brook, and flows southward, past Upminster, into the Thames. It is about 12 miles long. A stream of about the same length, which rises close to Thorndon Park near Brentwood, falls into the Thames near Purfleet.

The Crouch rises on the slope of the hills, south of Billericay, and flows east by north about 25 miles into the sea, passing the villages of Ramsden Cray, Wickford, Runwell, and much lower down, the village of Burnham. The tide flows about 13 miles up the river and is kept from overflowing the low lands on its banks by mounds. In the tideway there are many arms; and the various channels by which the river communicates with the sea form the group of Foulness, Wallasea, and the adjacent islands. Just above its mouth it receives the Broom-hill river (10 miles long), which is navigable for seven miles nearly up to Rochford.

The Blackwater, which in the upper part of its course is called the Pant, rises near the village of Wimbish, three or four miles from Saffron Walden, in the north-western part of the county. It flows first south-east and then south about 30 miles, past Redwinter, Great Sampford, Little Sampford, Great Bardfield, Weathersfield, Shalford, Panfield, Bocking, Stisted, Coggeshall, Kelvedon, Great Braxted, and Little Braxted, to the neighbourhood of Witham. Here it is joined by the Pods Brook, a stream 14 or 15 miles long, which rises near Great Bardfield and flows past Rayne, Braintree, Black Notley, White Notley, Faulkbourn, and Witham. From the junction of this stream the Blackwater flows south about 4 miles to the junction of the Chelmer; after which it flows east about 12 miles into the sea, having a course of about 46 miles. From Maldon, which is below the junction of the Chelmer, it is a tide river; and its estuary, which is at high-water from 1½ to 2½ miles wide, contains the islands of Northey, Osey, Ramsey, and Pewit. Lawling Creek and Goldhanger Creek are channels in the ooze or strand of this tideway.

The Chelmer rises near Debden, two or three miles south of the sources of the Blackwater, and flows south-south-east about 23 or 24 miles to the town of Chelmsford, passing Thaxted, Tiltey, Great Easton, Dunmow, Great Waltham, and Little Waltham. At Chelmsford it is joined by a stream which rises near Thorndon Park and flows northward between Billericay and Ingatestone to Widford and Writtle, and then turns east and runs into the Chelmer after a course of about 14 miles. From Chelmsford the Chelmer flows east about 10 miles till it falls into the Blackwater near Maldon. Its whole course is about 34 miles. The Sandon Brook, which rises near Stock, two miles north-east of Billericay, and has a course of about 10 miles, joins the Chelmer between Chelmsford and Maldon. The Ter rises between Felsted on the Chelmer and Rayne on the Pods Brook, and flows south-east 13 or 14 miles into the Chelmer, which it joins about two miles below the junction of the Sandon Brook. It passes Little Leighs, Great Leighs, Terling, and Hatfield Peverel.

The Colne rises in the north-western part of the county, between Great Sampford on the Pant, and Steeple Bumpstead on the Stour. It flows east about 7 miles to the neighbourhood of Great Yeldham, where it is joined by another stream of nearly the same length. From this junction it flows south-east 6 miles past Castle Hedingham and Sible Hedingham to Halsted; and from thence east-south-east about 13 miles to Colchester. Below Colchester it becomes a tidewater and flows 8 or 9 miles south-east into the sea at the north-east end of Mersey Island. Its whole course is about 35 miles.

The Roman rises about 2 miles north of Coggeshall on the Blackwater, and flows east by south about 13 miles into the tideway of the Colne, which it joins midway between Colchester and the sea. A brook eight or nine miles long from Layer Marney and Layer Breton joins the Roman about three miles above its junction with the Colne.

The Stour may be considered as equally belonging to Suffolk and Essex. Of the three springs which may claim to be its sources, one which flows past the village of Keddington is in Suffolk; a second in Cambridgeshire, and from it a stream flows by the town of Haveril in Suffolk; the third spring is in Essex, and the stream from it passes Steeple Bumpstead. From the junction of these three streams, which takes place about 6 or 8 miles from their respective sources, the river to its outfal divides the counties of Essex and Suffolk. Its course is first east about 10 miles past Wixoe, Stoke, Clare, and Cavendish in Suffolk, to the neighbourhood of Long Melford, above which it receives two small tributaries on the Suffolk bank; from thence its course is south by east about 8 miles past Sudbury in Suffolk to Bures: and from thence east 13 miles past Neyland, in Suffolk (below which it receives two considerable affluents), and Dedham in Essex to Catawade bridge, just above Manningtree. Below Catawade bridge the stream widens into a considerable æstuary, 11 or 12 miles long, and for the most part above a mile wide, which unites with the æstuary of the Orwell, a Suffolk river, and passes into the open sea between Harwich and Languard Fort. Its whole course is about 50 miles. Manningtree, Mistley, Wrabness, and Harwich are on the Essex bank of this æstuary.

The Cam rises near Debden, 4 miles from Saffron Walden, and flows first south-west for 2 miles, and then turns north and flows 8 or 9 miles past Newport, Audley Park, Littlebury, and Little and Great Chesterford, into Cambridgeshire, to which the principal part of its course belongs.

The Thames and the Lea are navigable throughout that part of their course which belongs to this county; the Stort is navigable from Bishop Stortford to its junction with the Lea; and it has been projected and acts of parliament obtained (A.D. 1812 and 1814) to make a navigable canal from Bishop Stortford along the valley of the Cam to the navigable part of that river below Cambridge, thus uniting the Thames and the Lea with the Cam and the Ouse. The tideway of the Crouch is navigable, and serves for the importation of groceries and fuel, and the exportation of agricultural produce. Near Burnham this river is a quarter of a mile wide (not three quarters of a mile, as Mr. Young states in his 'Agricultural Survey'), and has depth of water sufficient for a 98-gun ship: a 74 might go almost up to Hull bridge at the head of the tideway. The Blackwater does not appear to be navigable above the junction of the Chelmer. Vessels of considerable burden can get up to Maldon at spring tides. The Chelmer is navigable to Chelmsford. This navigation supplies Chelmsford and other places in the interior of the county with coal, deals, timber, and groceries, and serves for the exportation of agricultural produce. The navigation of the Colne, which extends to Colchester, answers the same purposes for that town and neighbourhood. The river Stour is navigable up to Sudbury, about 30 miles above Harwich. Essex has no navigable canals.

The principal roads in the county are the three roads from London to Norwich, by Ipswich, by Bury, and by Newmarket. The road by Ipswich enters the county at Bow bridge, about three miles from Whitechapel church, London, and crosses the county in nearly its greatest extent from south-west to north-east, passing through the market towns of Romford (12 miles from London), Chelmsford (29 miles), Witham (38 miles), and Colchester (51 miles), 7½ miles beyond which the road crosses the Stour at Stratford bridge and enters Suffolk. The road through Bury branches off from the Ipswich road at Chelmsford, and passes through the towns of Braintree (40½ miles from London) and Halsted (46½ miles), 8 miles beyond which the road crosses the Stour into the town of Sudbury in Suffolk. A branch from this road passes through the villages of Sible Hedingham, and Castle Hedingham, instead of through Halsted, and reunites with the main road about 2 miles before it quits the county: this branch is rather longer than the principal line. The road by Newmarket branches off from the Ipswich road a little beyond Bow bridge, crosses part of Epping Forest, and runs through the town of Epping (17 miles from London), about 7 miles beyond which it crosses the Stort into Hertfordshire: between 29 and 30 miles from London it re-crosses the same river into Essex, runs northward near but not through Saffron Walden, and finally quits the county at the village of Great Chesterford, 45 miles from London. A road which quits London by Shoreditch church enters the county at Lea bridge, and falls into this road at Snaresbrook, about 7 miles from London.

From the road by Colchester and Ipswich several roads branch off to different places on or near the bank of the Thames, or on the south and east coasts, as to Billericay (23 miles from town); to Tilbury Fort (25 or 29 miles by different roads); Southend (42 miles); and Maldon (37¼ miles), from which place are roads to the villages of Bradwell (51 miles), Southminster (48 miles), and Burnham (48½ miles), in the marshes of the south-east coast. From Colchester there are roads to Harwich (71½ miles from London), at the north-east extremity of the county, and to Neyland, in Suffolk (57 miles), on the border of Essex. From the Colchester road, near Bow bridge, a road runs by Chipping Ongar (21 miles) to Dunmow (40¾ miles). From the Bury road, between Braintree and Halsted, there is a road by Sible Hedingham to Haverill, in Suffolk (59 miles), on the borders of Essex. The towns in the northern part of the county are connected by a road which runs from Bishop Stortford, in Herts, on the border of Essex, through Dunmow, Braintree, and Coggeshall to Colchester. A road from Saffron Walden runs through Thaxted and Dunmow to Chelmsford; and short branches from the Colchester and Harwich roads lead respectively to Coggeshall and Manningtree.

Geological Character.—A considerable tract in the northern part of the county, stretching along the river Stour from the village of Keddington to between Sudbury and Neyland, and extending into the interior of the county, bounded by a line drawn from Keddington to the village of Hempstead, six miles east of Saffron Walden, from thence to Thaxted and the village of Great Easton on the road from Thaxted to Dunmow, and from thence by the neighbourhood of Halsted (a mile or two north of that town) to the Stour, is occupied by diluvial beds, consisting of loam with fragments of chalk. The coast of the north-east part of the county is covered with the sand or gravel of the upper marine formation, which occupies a considerable part of the counties of Norfolk and Suffolk, and is locally designated 'crag.' At the headland of the Naze it constitutes about 30 feet of the upper part of the cliffs (which are about 45 feet high) resting upon the London clay: south of the Naze its thickness appears to vary from 10 to 40 feet. In the projecting cliff of Harwich it includes friable masses of ferruginous sand, somewhat cemented together, and inclosing shells. The shells of this formation are in excellent preservation, commonly in a confused mixture, but at other times in patches of particular genera, and for the most part they do not appear to differ specifically from those of the neighbouring seas. Fragments of fossil bones washed out of the strata of this formation, in which they had been imbedded, are found on the beach at Walton, but occur in much greater quantities at Harwich. It is not known to what animal these belong, but a large fossil tooth, probably of the mammoth, was found, within the last few years, on the beach at Harwich. (Phillips and Conybeare, *Outlines of the Geology of England and Wales*.) In Mr. Greenough's Geological Map of England and Wales the cliffs south of the Naze are said to consist of loam, which contains the bones of the elephant, deer, horse, pig, aurochs or wild bull, and hippopotamus; and the strata along the south bank of the æstuary of the Stour are said to contain elephants' teeth.

The greater part of the county, including Epping and Hainault or Henhault Forests, is occupied by the London clay. This formation extends on the south and east to the banks of the Thames, to the coast, and to the tract occupied by the Crag: it is bounded on the inland side by a line drawn from the banks of the Stour about Boxted near Neyland to the junction of the Stort with the Lea. These may at least be taken as its approximate limits, for some of the beds of the plastic clay formation, which immediately underlies the London clay, are so similar to it, that it is difficult to trace exactly the line of demarcation. The London clay of the cliffs near Harwich contains beds of stratified limestone: the same cliffs are very productive in the fossils with which this formation abounds. South of Walton, near the Naze, abundance of septaria are found, which are sent by sea to Harwich, where they are manufactured by government into a cement. The principal elevations in the county, High Beach, Langdon and Danbury Hills, and Tiptrey Heath, are formed of London clay. The

surface of the vegetable mould does not commonly rest immediately on the London clay, but on alluvial beds of rich marl and loam, which often alternate with gravel and sand, and sometimes have a thickness of 30 or 40 feet.

The sands and clays of the plastic clay formation skirt the district of the London clay on the north-west. Halsted and Coggeshall, with the intermediate tract, are both on the plastic clay. The border of Essex, near Hadleigh, is the most northerly point at which this formation has been found.

The north-western extremity of the county, about Saffron Walden, consists of chalk: the great chalk district, in its extension from south-west to north-east, just crosses that part of the county. The chalk appears also at Purfleet and Gray's Thurrock, on the banks of the Thames. At the former place is an extensive chalk-pit belonging to Mr. Whitbread. Gun-flints are made at or near Purfleet. A subterranean forest underlies the marshes on the banks of the Thames.

Agriculture. The climate of Essex is favourable to vegetation: the sea and the numerous æstuaries which bound it on the south and east soften the rigour of winter, and keep up a certain degree of moisture in summer. The same cause, however, produces cold fogs and exhalations in spring and autumn, which are very prejudicial to the health of those who are not inured to the climate. In consequence of this the most fertile portions of the county, which lie along the Thames and the sea coast, towards the Colne river, and which are usually called the hundreds of Essex, contain few seats of men of fortune; and notwithstanding the richness of the soil, and the great advantage of the marshes for feeding cattle, few men from other counties venture to take farms in this part of Essex. This reproach to the climate of the hundreds of Essex is rapidly diminishing, since the marshes have been better drained and the woods, which prevented the free circulation of the air, and the dispersion of the fogs, have been gradually cut down, and the land brought into cultivation. The soil all along the coast, and 10 or 12 miles inland, is of a very excellent quality, being a friable loam of greater or less tenacity in different parts, but peculiarly adapted to the cultivation of wheat, beans, and oats. The Isle of Mersey, which lies at the mouth of the Colne river, has been long noted for the fertility of its soil, which is a fine alluvial loam composed of the various earths deposited from the river and the sea, like the warp lands along the Humber, or the polders in the Netherlands. The whole island is protected by a sea-wall, and produces every kind of grain which is usually cultivated; wheat, barley, oats, beans, and rape seed are the principal produce. Sir Humphry Davy found that the soil taken from Mersey Island and dried recovered its moisture from the atmosphere in less time than any other on which the experiment was tried; and this gives perhaps a better measure of fertility than any chemical analysis of its constituent parts. The best soils of Essex lie low, and require to be protected from the sea by embankments. Many marshes which formerly produced nothing but herbage, and were subject to inundations, are now converted into arable fields; and a great tract of land all along the coast, which used to be covered by the sea at high tides, is now laid dry by proper deep and broad ditches, here called fleets, and protected by high and well-constructed sea-walls, the repairs of which are a great expense to the proprietors. In some of these marshes the want of fresh water in summer was often felt severely. But lately recourse has been had to boring, which has been attended with great success, especially in the marshes at St. Osyth, where the finest springs of water have been found, which flow over the surface, and keep ample reservoirs continually full. The depth at which the water was found did not exceed fifty feet. This discovery greatly increases the value of these marshes in dry summers, such as that of 1836. The soil in the uplands along the coast consists chiefly of good loams varying in tenacity from a strong clay to a light gravel; most of it is of such a nature as to bear both turnips and beans. The stiffest soils, as well as the lightest, which form the two extremes, are more inland. The whole county has an undulating surface, which is very pleasing when fields and woods are interspersed, as is very generally the case in this county. The only level tract is that along the Thames, which extends to its mouth and along part of the south-eastern coast. The remainder consists of gentle elevations just sufficient to give a great variety of soil and aspect. The clay soils, on the whole, prevail in most parts of the county, and from this circumstance arises the modes of cultivation and the rotations of crops which are most commonly adopted. There are very few such light soils in Essex as there are in Norfolk and in Lincolnshire, and except on the borders of Hertfordshire and Cambridgeshire, chalk and marl are rare.

The cold wet clays have given rise to a mode of tillage which is minutely described by Arthur Young in his 'View of the Agriculture of this County, and held out as a pattern for the cultivation of cold wet clays. It consists of repeated ploughings in spring and summer, and exposure to frost in winter; two things, no doubt, highly beneficial to stiff land. But since the introduction of extensive under-draining and high manuring, much of the labour of the horses in ploughing and harrowing has been saved. The peculiarity of the Essex method, on stiff clays, was to work the fallows two winters for barley, during which period the land was ploughed in all directions eight or nine times, and even more, until it was sufficiently pulverized. The rotation was fallow; barley; fallow; wheat; beans: that is, two fallows in five years. The beans were frequently omitted: so that the land was alternately cropped and fallowed. No stock was kept on the farm, but a few cows for the use of the farmer, and the horses required to plough the ground: and the soil not being favourable for artificial grass, very little manure could be made except upon those farms which have marshes attached to them, which is not generally the case where the soil is the stiffest. There was consequently no sufficient manure for the land, and fallows were unavoidable to keep the soil in a moderate state of fertility. From sixteen to twenty bushels of wheat per acre, and from twenty-four to thirty of barley, was a common average produce on very good clays, which, with under-draining and proper manuring, now produce thirty-two of wheat and forty-eight of barley. The fallows at the same time are now removed to every fifth or sixth year.

The present mode of ploughing in Essex is similar to that of Norfolk and Suffolk; the ploughs most commonly in use are Suffolk wheel-ploughs, or swing ploughs without wheels. The great manufactory of these instruments is that of Messrs. Ransom, at Ipswich, which chiefly supplies the three eastern counties. In good loams, not too stiff, two horses are driven abreast with reins, whether the plough has wheels or not. In the very heavy wet clays three horses are used, who walk one before the other in the furrow. The object is that they may tread the land less; but some very judicious agriculturists maintain that three horses treading the bottom of the furrow render it quite impervious to water, and do more harm than if they had walked abreast over the land already ploughed, where they would only have trod in small cavities. This is rather a new mode of viewing the subject, but it is worth considering, and making trials to ascertain the real effect.

After harvest the stubble is generally ploughed in, and before winter the field is laid in narrow ridges which are formed by two turns of the plough, and sometimes by four turns, or two bouts, as they are called. The ploughmen are expert in this, and lay the ridges very regularly, sometimes diagonally across the field, which has a good effect in dividing the soil more completely. In this form a greater surface is exposed to the frost and air, and in spring it is mellow and crumbling, where in autumn it rose in an unbroken furrow. If a fallow is intended to clean the land, it is ploughed at intervals, and the roots of weeds gathered and burnt; if it is not very clear of these by wheat-sowing time, it is put in ridges again till the next spring, by which time it is quite pulverized, and fit to be manured for barley and clover. If wheat is sown in autumn, the manure is put on before the last ploughing.

The most common rotation on the stiffest clays which will not bear turnips is now 1, fallow; 2, wheat or barley; 3, clover; 4, oats or wheat; 5, beans; and where manure is abundant, a second crop of wheat is taken in the sixth year, before the course begins again. On the rich soils which bear turnips the usual rotation is turnips, barley, clover, wheat, beans, oats, or wheat. The manure is put on for the turnips and the beans: pease and tares are taken on part of the land, which otherwise would have had clover, and on that where the clover has failed. The mole plough has been used with good effect in many stiff soils, but the treading of the horses when the ground is soft, the only

time when the mole plough can be used with effect, does a great deal of harm on such land, so that this instrument is not so generally used as it might be. The method of draining introduced of late is so superior in its effects to the mole plough, that this instrument will soon be laid aside, except in old pastures, where it may sometimes save the expense of draining. The subsoil plough is not yet generally introduced, but will, no doubt, soon be found an admirable instrument. The feeding of oxen in winter is now extensively practised by all good farmers in Essex, whether of strong or light loams. In sandy and gravelly soils sheep may be more profitable; but where turnips, especially the Swedish, or mangel wurzel can be raised, on heavy soils, the only practical plan is to draw them and give them to the cattle in yards or stalls, together with straw and oil-cake. When the soil will not allow the carts to go over the fields where the turnips are without doing harm in winter, asses with panniers are used to bring the turnips to a cart on the hard road, or at once to the yard, if it is near at hand. Asses and boys may be employed in this manner with advantage in many situations, and the expense will not exceed that of horses and carts, although they bring but a small load at a time.

In those farms which have marshes attached to them a great number of cattle is constantly kept, and all the straw is converted into manure, by which the arable land is kept in a high state of fertility. Along the Thames the salt marshes are extensive, and are profitable from the number of horses which are sent to feed there from London, after they have been over worked and require rest, or when they have met with some accident. Where there is not a sufficient number of horses taken in to stock the marshes, oxen and sheep are bought to complete the number, but the profit on these is seldom equal to that on horses agisted.

Besides the common crops usually cultivated, a considerable quantity of cole or rape seed is raised on the richer alluvial soils of the hundreds. It is a profitable crop, owing to the abundant supply of manure brought from London by the Thames. In other situations it has been found to deteriorate the succeeding crops too much, and the cultivation has been abandoned. Flax is not cultivated anywhere in the county, at least to any extent, and very little hemp is sown. A few hops are raised in the western part of the county, towards Cambridgeshire. The cultivation of this plant is spreading rapidly, and every year some new hop gardens are formed. The extent of hop ground is however inconsiderable, when compared with that in the hop-growing counties of Kent, Surrey, Hertfordshire, &c. The cultivation of caraway, coriander, and teazles, which is peculiar to this county, is described under CARAWAY.

In that part of Essex which lies within a few miles of London the cultivation of the soil partakes more of the garden culture. Vegetables, especially cabbages, are raised in great quantities, and very extensive fields are almost entirely devoted to the raising of potatoes. The ground is ploughed, and very highly manured with stable dung from London. The potatoes are usually set by hand, and moulded up with the plough. They are taken up with the common three-pronged fork, and wheat is immediately sown after the principal crop is taken up. Those which are of an early kind, and taken up in June or July, are followed by cabbages. Mangel wurzel for the London cowmen are also raised in considerable quantities. The meadows within fifteen miles of London regularly supply the Whitechapel market with hay, and every cart brings back a load of dung.

The cows and horses in Essex are chiefly reared in Suffolk, and Scotland supplies the oxen to fatten. There are a few considerable dairies about Epsom; but in general the number of cows kept on a farm is not considerable. Many calves are fatted, which are killed in the country, or go to Romford to be sold to London butchers.

Sheep are now kept in greater flocks by the Essex farmers than they used to be, and with considerable advantage. By means of draining, the land has been made capable of being folded over even in winter. It is not a sheep-breeding county, although many fine lambs are reared; but they are generally bought from the breeders in Wiltshire or Sussex in autumn, and sold fat to the butcher in the succeeding spring. The South-down breed is preferred in general; but there are also many improved Leicesters, and lately the Norfolk sheep have come into favour with some farmers, who think them hardy and profitable, and whose fences are in such a state as to repress their rambling propensities. There is no peculiar breed of horses. The Suffolk punches seem to be in general use for farm work, and it is scarcely possible to find a breed better adapted for every kind of work. When crossed with a half bred horse of some substance and action, a Suffolk mare produces admirable carriage horses. In the marshes a good many horses are bred of various kinds, chiefly for draught. Essex has been long noted for a superior breed of pigs, which has been produced and improved by crosses with foreign breeds, chiefly the Neapolitan, which has very little hair, and the Chinese. The common Essex pigs have long ears standing upright, and thin in their texture. The best breeds are quite black, and have *wattles*, which are small appendages of skin like a long teat, hanging from the neck under the jaws. The most common Essex pigs, which are brought in great quantities to Smithfield market, are black and white, the head and rump being generally black, and the back and belly white. They fatten early, and make excellent small pork when fed on the refuse of the dairy. Lord Western's breed is in great repute, not only in Essex, but all over England.

The principal fairs in Essex are:—Billericay, August 2; October 7. Bishop Stortford, Holy Thursday; Trinity Thursday; October 10. Barking, October 22. Braintree, May 8; October 2 and 3. Chelmsford, May 12; October 12. Coggeshall, Whit Tuesday and Wednesday. Colchester, July 5, 23; October 20. Dunmow, May 6; November 8. Epping, Whit Tuesday; November 13. Grays, May 23; October 20. Halsted, May 6; October 29. Harlow, May 13; September 9; November 28. Lachinden, near Maldon, August 27. Maldon, May 1, 2; September 13, 14. Romford, June 24. Saffron Walden, day before Mid-lent Sunday; November 1. Stansted, May 12. Stebbing, July 9. Thaxted, Monday before Whit Monday. Waltham Abbey, May 14; September 25.

Divisions, Towns, &c.—Essex is divided into twenty parts, of which fourteen are called hundreds, five half hundreds, and one royal liberty. We subjoin a table of these divisions, with their situation, their respective areas, and population in 1831. We have distinguished by the letters (*h*) and (*l*) the half hundreds and the liberty.

	Acres.	Inhabitants.
Barstable, S.	73,290	13,181
Becontree (*h*), S. W.	35,950	31,924
Chafford, S.	34,930	9,988
Chelmsford, Central	81,560	27,179
Clavering (*h*), N. W.	18,140	4,062
Dengey or Dengie, S. E. (including the borough of Malden.)	59,110	13,746
Dunmow, Central	54,670	12,791
Froshwell or Freshwell (*h*), N. W.	27,710	6,807
Harlow (*h*), W.	28,660	7,796
Havering (*l*), S. W.	12,550	6,812
Hinckford, N.	109,610	40,183
Lexden, N. E. (including the borough and liberty of Colchester.)	73,830	37,677
Ongar, Central	58,060	14,715
Rochford, S. E.	57,980	13,604
Tendring, N. E. (including the borough of Harwich.)	82,900	27,083
Thurstable, E.	23,640	5,942
Uttlesford or Utlesford, N. W. (including the corporate town of Saffron Walden.)	59,550	17,257
Waltham (*h*), W.	25,240	8,351
Winstree, E.	23,790	4,411
Witham, Central	37,830	10,998
	979,000	317,507

There is no city in Essex. There are nineteen market-towns: three of these are parliamentary boroughs: Colchester, on the Colne, population of the borough and liberty in 1831, 16,167; Harwich, at the mouth of the Stour, population in 1831, 4297; and Maldon, on the Pant or Blackwater, population in 1831, 3831. Chelmsford, the county town, is on the Chelmer; population in 1831, 5435. Of these places, as well as of Barking, a market town on the Roding (population of the town ward in 1831, 3404; of the whole parish, which includes Ilford, 8036), an account is

given under their respective names. Of the other towns we subjoin an account.

Billericay is in the hundred of Barstable: it appears in one antient record, under the name Beleuca, which is probably a variation of the old word Baleuga or Banleuga (in French Banlieu), the territory or precinct round a manor or borough. The town stands on an eminence on the road leading from London, through Brentwood, to Rochford and Southend. In Camden's time the market was considerable, but for a long time past it has been much decayed. The town has been much improved of late years by a number of good houses, and from its situation commands a beautiful prospect over the valley which extends southward to the Thames. It is in the parish of Great Burghsted or Bursted, the church of which is about a mile and a half or two miles south of the town. There is a chapel in Billericay, supposed to have been founded in the fourteenth century: the tower, which is surmounted by a leaden spire, may be of that date, but the body of the chapel is of more modern origin. There are places of worship for Baptists, Independents, and Quakers.

The inhabitants of the parish of Great Bursted, in 1831, were 1977, of which about two-fifths were engaged in agriculture. There is a weekly market on Tuesday. There are scarcely any manufactures. The living is a vicarage, with the chapel of Billericay annexed. By the Education Returns of 1833, there were in the parish twelve day and five boarding-schools with 260 children, and two Sunday-schools with 171 children. One of the day-schools, with 49 scholars, has a small endowment. There is a parish alms-house for poor women.

At Blunts-walls, near Billericay, are some earth works, the remains of a ditch and rampart, enclosing an area of about four acres: within the area were some artificial mounds, now chiefly levelled. Some remains of Roman pottery, several Roman copper coins and two silver coins, one of Trajan and one of Adrian, have been found in the neighbourhood.

Braintree is in the hundred of Hinckford, and on the north bank of Pod's Brook; it is on the high road from London to Norwich, through Bury, 40½ miles from London and 11½ from Chelmsford, the county town. Antiently the manor of Braintree, or, as it is termed in Domesday, Raines, comprehended the neighbouring parish of Rayne as well as that of Braintree: part of the lands in it belonged to the bishops of London; it was alienated by Bishop Ridley at the time of the Reformation: the manor house (long since destroyed) was an episcopal palace. The parish was dismembered from that of Rayne, of which it was previously a hamlet, about the time of John or Henry III., the former of whom constituted it a market-town. The growth of the place is to be ascribed to its situation on one of the high roads from London into Norfolk and Suffolk, and to the building of inns and lodging-houses for the reception of the numerous pilgrims to the shrines of St. Edmund at Bury, and our lady of Walsingham in Norfolk. At the Reformation this source of its prosperity failed; but the town, and the adjacent village of Bocking, obtained consequence by the settlement of the Flemings who fled from the tyranny of the duke of Alba and established here the manufacture of baize and other light woollens, which for some time constituted the staple manufacture of the place, and is still carried on, though not to so great an extent as formerly.

It will be desirable to consider, in connection with Braintree, the adjacent village of Bocking; for although Bocking Church and Church Street are a mile and a half from Braintree, and on the north-east bank of the Pant or Blackwater, what is termed Bocking Street is contiguous to Braintree, and the two form one continuous place, the main street of which covers two-thirds of the extent between Pod's Brook and the river Pant, and stretches about a mile. Braintree consists of this street and of some others, formed by the intersection of the road from Bishop's Stortford and Dunmow to Coggeshall and Colchester, with the Norwich road, and by the convergence at this point of bye-roads from the surrounding villages: there are some back streets or lanes. The streets are inconveniently narrow; and many of the houses are of wood, and of considerable antiquity. The church is on the right at the entrance of the town from London; it is large, built chiefly of flint, and mostly in the perpendicular style of English architecture: the tower, at the west end, is of early English, and is surmounted by a lofty shingled spire of much later date. This church was enlarged in the time of Henry VIII., the expense of the alteration being partly defrayed by the profits of three mysteries or plays performed in the church. There are places of worship for Independents, Baptists, Quakers, and Methodists. Bocking Church is remote from the town: it is spacious and handsome, and chiefly in the perpendicular style; the tower is lofty and well designed. In the neighbourhood of Braintree are the remains of an antient church, formerly the parish church. Some coins, sepulchral urns, and other Roman antiquities, have been found.

The parliamentary returns for 1831 assign to the parish of Braintree an area of 2500 acres, 708 inhabited houses, and a population of 3422, about one-sixth agricultural: to that of Bocking an area of 3800 acres, 647 inhabited houses, and a population of 3128, about one-fourth agricultural, giving an aggregate of 6300 acres, 1355 houses, and 6550 inhabitants. The woollen manufacture has been in a great degree superseded by that of silk and crape, which is carried on to a considerable extent. The market is on Wednesday for corn, eggs, poultry, and occasionally cattle and live-stock of all kinds. There are several fulling and corn mills on the Pant.

The living of Braintree is a vicarage, of the yearly value of 212*l.*, with a globe-house, in the archdeaconry of Middlesex: that of Bocking is a rectory, of the yearly value of 923*l.*, with a glebe-house, in the peculiar jurisdiction of the archbishop of Canterbury, being subject only to his jurisdiction, or that of his commissary, who is called Dean of Bocking.

There is at Bocking an almshouse or hospital, originally for seven poor people, but now divided into nine tenements, with an endowment from the benefactions of several individuals. The returns made to parliament show that there were in the two parishes in 1833 twelve day or boarding and day-schools (two of them with 255 to 275 scholars, endowed, and three others with 340 scholars, supported by subscription), containing 813 to 833 scholars; one dame or infant school, with 60 or 70 scholars: and four Sunday-schools with 540 scholars.

Coggeshall is in Lexden hundred, on the northern bank of the river Blackwater, 44 miles from London by Chelmsford, Witham, and Kelvedon, where the Coggeshall road turns off from the Ipswich and Norwich road. It is sometimes called Great Coggeshall, to distinguish it from the adjacent hamlet of Little Coggeshall. This town has by some antiquaries been considered to be the Canonium of Antoninus; and several Roman remains have been found in and about the town, but these are not deemed by others sufficient to prove anything more than that a Romish villa existed here. Morant, the historian of Essex, ascribes the origin of Coggeshall to an abbey, founded here in 1142 by King Stephen and Maud, his queen, for Cistertian monks. To this abbey succeeding princes granted various privileges, among which was that of holding a market weekly. The yearly revenue of the abbey at the dissolution was 298*l.* 8*s.* gross, or 251*l.* 2*s.* clear. The town was formerly much engaged in the clothing trade, and was particularly famous for a white baize of superior fabric, called Coggeshall Whites. The clothing trade has much declined for many years past.

The town is irregularly laid out, and the streets are narrow and ill paved. The church, at the north-eastern end of the town, is a spacious and handsome building in the Perpendicular style of English architecture: the windows, especially the east window, are large and handsome; there is a large square tower at the west end. A small part of the abbey is yet remaining; and near it is a bridge of three arches, originally built by King Stephen over a cut made to convey the water of the river nearer to the abbey. The abbey has some good plain lancet windows, and the interior has some good groining and windows, with shafts; it is occupied as a farm-house. At Little Coggeshall, a hamlet of the town, half a mile south of it, said to have been once a distinct parish, were formerly two churches, one of them built by the monks of the abbey for their own use, the other the parish church: the former has been long demolished; the latter, or what remains of it, is now used as a barn. There are meeting-houses for Independents, Baptists, Quakers, and Methodists.

By the returns of 1831, the parish comprehended an area of 2770 acres, and had 624 inhabited houses, with a population of 3227, about two-sevenths agricultural. The

silk manufacture has been introduced here, and constitutes the principal manufacture of the place; that of woollens has declined. Some of the inhabitants are engaged in toy making. The market is on Saturday for corn, butter, eggs, and poultry, and occasionally live stock.

The living is a vicarage, of the yearly value of 215*l.* with a glebe house, in the archdeaconry of Colchester.

There are three unendowed almshouses near the church, and there is an endowed school. The parliamentary returns for 1833 assign to Coggeshall eleven day, or boarding and day, or evening schools, one endowed and one Lancasterian, with 294 scholars; thirteen dame or infant schools with 189 scholars; and six Sunday-schools with 490 scholars.

Dunmow, or Great Dunmow, is in Dunmow hundred, on the south-west bank of the river Chelmer, 38 miles from London by Epping, Harlow, and Hatfield Broad Oak: 40½ by Chigwell, Abridge, and Ongar; and 42 by Chelmsford, Great Waltham, and Barnston. Great Dunmow is considered by some antiquaries to have been the Roman station Cæsaromagus, which others fix near Widford, two miles south-west of Chelmsford. A number of Roman coins, of different emperors, have been found here. It is on a Roman road, crossing the county from west to east from Hertford to Colchester.

Dunmow is pleasantly situated on an eminence, and consists principally of two streets The market-cross in the centre of the town was erected in 1578, and repaired in 1761. The church stands a considerable distance from the main portion of the town: the houses adjacent to it form a group called Church End. It is a spacious building, with an embattled tower at the west end; it has some portions in the Decorated English, and some in the Perpendicular style: the east window, which is very fine, is of Decorated character. There are meeting-houses for Independents, Baptists, and Quakers.

The area of the parish is 7910 acres; there were in 1831, 499 inhabited houses, and 2462 inhabitants: nearly one-half of the population is agricultural. The manufacture of baize and blankets, formerly carried on, has been given up; some sacking and coarse cloth are made. The market, which according to one of our latest authorities has been discontinued, was on Saturday.

The living is a vicarage of the yearly value of 421*l.*, with a glebe house, in the archdeaconry of Middlesex. There is an almshouse for six poor persons.

About two miles east of Great D mow is the village of Little Dunmow (population in 1 378), where was a priory of Augustine canons, founded in 1104 by the Lady Juga, sister of Ralph Baynard, the then lord of the manor. Its yearly value at the dissolution was 173*l.* 2*s.* 4*d.* gross, or 150*l.* 3*s.* 4*d.* clear The monastic buildings are now razed, and the site partly occupied by the manor house. The priory church was a large and stately fabric, partly in the decorated English, partly in an earlier style of architecture: the roof was sustained by pillars, having capitals ornamented with oak leaves elegantly carved. Some of these remain in the part now used as the parish church. The well-known custom of the 'flitch of bacon' was connected with the manor of Little Dunmow. [DUNMOW BACON.]

Easton Lodge, the seat of Viscount Maynard, is situated on high ground in a spacious park about two miles northwest from Great Dunmow. It is a venerable pile of the Elizabethan period and style. In the returns of schools made to parliament for 1833, no account is given of those at Great Dunmow, except that there was a national school for girls, containing 103 scholars; and that a national school for boys, suspended from various causes at Christmas, 1832, had at the time of the suspension an average attendance of 75.

Epping is in the half hundred of Waltham, and on the high road from London to Norwich by Newmarket, 17 miles from London. The principal part of the town, called Epping Street, consists of a street extending more than half a mile in length, lined with irregularly built houses, and having in the centre a row of decayed mean-looking shambles. The church is situated two miles northwest of the street, and with the houses grouped round it constitutes what is distinguished as Epping Upland. The church is pleasantly situated on a rising ground: it is dedicated to All Saints, and is not distinguished by its architecture. In the 'Street' is a chapel of ease originally belonging to the abbot and monks of Waltham, to whom the great tithes had been granted, and who kept the parish in their own hands as a curacy. The chapel is now vested in trustees for the benefit of the inhabitants. It stands at the London entrance to the town, and has lately been rebuilt. There are places of worship in Epping for Quakers and Independents; but that for the Quakers, though close to the town and virtually belonging to it, is in an adjacent parish. There are many inns in the place.

The parliamentary returns for 1831 assign to Epping an area of 5250 acres, 429 inhabited houses, and 2313 inhabitants, of which 83 houses and 427 inhabitants are in Epping Upland and the hamlet of Ryhill, the last in Harlow hundred. In Epping Upland four-fifths of the population is agricultural, in the whole parish about two-fifths. The neighbourhood of Epping is celebrated for butter, pork, and sausages, of which articles it furnishes a considerable supply to the metropolis. The market is on Friday. In the spring great numbers of suckling calves are brought to Epping market from Suffolk, and those parts of Essex where dairy farms are numerous.

The living of Epping is a vicarage 'in the peculiar jurisdiction of the Court of the Commissary of London, concurrently with the Consistorial Episcopal Court.' (Lewis's *Top Dictionary.*) Its yearly value is 729*l.*, with a glebe house: the chapelry is of the yearly value of 120*l.*, arising from endowments.

The returns made to parliament in 1833 assign to the parish of Epping four infant or dame schools, with 50 children, eight boarding or day schools (one of them a charity school), with 343 scholars, and one Sunday school, with 70 boys. About 70 girls from this parish attend the national school of Theydon Garnon or Theydon Gernon (two miles south-east of Epping Street), to which the parishioners of Epping contribute largely.

In the parish of Epping is Copped Hall, a mansion erected near the site of an older structure raised by the monks of Waltham Abbey when they had possession of the manor; it was built near a century ago, and has since been much improved. It is one of the finest seats in the county. Near it are the remains of an antient camp, probably British, now overgrown with trees, called Ambreys, or Ambersbury banks.

Epping gives title to Epping Forest, a considerable tract of waste land in the south west part of the county. This forest was formerly called the forest of Essex, being the only forest in that county, the whole of which was antiently comprehended in it. By a charter of king John, dated 25th of March, in the fifth year of his reign, and confirmed in the eighth of Edward IV., all that part of the forest which lay to the north of the highway from Storiford to Colchester (very distant from the present boundaries) was disafforested. The forest was further reduced by a perambulation made in the twenty-ninth of Edward I., in pursuance of the Charta de Foresta: but the metes and bounds of it were finally determined by an inquisition and perambulation taken on the 8th of September, 1640, by virtue of a commission under the great seal of England, in pursuance of an act of the 16th of Charles I., for settling the bounds of the forests. The boundaries as thus settled include the whole of the eleven parishes of Wansted, Leyton, Walthamstow, Woodford, Loughton, Chigwell, Lambourne, Stapleford Abbotts, Waltham Holy Cross, Epping, and Nazing, and parts of the ten parishes of Chingford, Stratford, East Ham, West Ham, Little Ilford, Great Ilford, Barking, Dagenham, Haverstock, and Theydon Bois. The extent of the forest is estimated at 60,000 acres, of which 48,000 acres are estimated to be enclosed and private property: the remaining 12,000 acres are the unenclosed wastes and woods. What is called Henhault, or Hainault forest, is a part of this waste. (*Fifteenth Report of the Commissioners of Land Revenue*, quoted in Young's *Agriculture of Essex.*) Tendring hundred had been disafforested by king Stephen before the grant of John mentioned above. (Morant's *History of Essex.*) Epping forest is much resorted to by Londoners in what are termed 'gipsy parties;' and on the first Friday in July a kind of fair is held round the spot once occupied by an enormous oak called Fairlop oak. The fair retains the title of Fairlop Fair. On Easter Monday there is a stag-hunt much patronized by the inhabitants of London. The kennel for the hounds and the building belonging to the hunt were rebuilt several years ago at an expense of many thousand pounds.

Grays Thurrock is in the hundred of Chafford; it is on the bank of the Thames, 24 miles from London, through

Romford, Upminster, and Stifford. This little town consists chiefly of one irregular street on a creek of the Thames, accessible to hoys and other small vessels. The church, near the north end of the town, is built in the form of a cross, with a tower on the north side.

The area of the parish is 1570 acres; the number of inhabited houses by the census of 1831 was 243, the population (including that of the liberty of Lee, in East Tilbury parish, Barstable hundred), 1248. The population had greatly increased before the census, owing to the number of labourers employed in brick-making. The market is on Thursday, and is chiefly for the sale of corn; it is much frequented: there is one yearly fair.

The living is a vicarage of the yearly value of 160*l.*, with a glebe-house: it is in the archdeaconry of Essex.

There were in 1833 eight day-schools, with 138 scholars, 20 of whom (boys) were educated from the proceeds of an endowment; and two Sunday-schools, with 202 children.

There are two villages near this town which also bear the name of Thurrock: Little Thurrock, to the east of the town (population 302), and West Thurrock, to the west of the town (population 804). The chalk-quarries of Purfleet are in the parish of West Thurrock. In Little Thurrock parish, and in Chadwell parish, which adjoins it, are some remarkable caverns or holes in the chalk, to which tradition has assigned the name of 'Cunobelin's gold-mines.' It has been conjectured that they were granaries of the antient Britons. They are also called 'Dane holes,' from having been used by those invaders as lurking-places or receptacles for plunder.

Halsted is in Hinckford hundred, on the north-east bank of the river Colne, and on the road from London by Bury to Norwich, 46½ miles from London, and 17½ from Chelmsford. It is supposed that a market was established here in the Saxon times: a hill at the upper end of the town, on which for several centuries it was held, retains the name of Cheping hill.

The town stands on the slope of a gravelly eminence, rising from the river, and consists of the main street along the Norwich road, and some other streets. The church is near the centre of the town. It is a large edifice, capable of accommodating 1200 persons, and consisting of a nave, chancel, and side-aisles, chiefly in the Perpendicular English style: the chancel is in the Decorated style, with a good window of five lights, and others of two lights. There is a tower at the west end surmounted by a wooden spire, the third that has been erected on the same tower, two previous ones having been destroyed by lightning. There are places of worship for Independents, Baptists, and Quakers. There is a house of correction at Halsted.

The parish comprehends an area of 6230 acres; and had, in 1831, 989 inhabited houses, and 4637 inhabitants: about three-eighths of the population was agricultural. The silk manufacture is carried on to a considerable extent: the manufacture of baize and other light woollens has been discontinued. There is a market on Friday, one of the principal in the county for corn and occasionally for cattle and other live stock. Some hops are grown round the town.

The living is a vicarage, of the yearly value of 390*l.*, with a glebe-house, in the gift of the bishop of London: the minor canons of St. Paul's are the impropriators. There was a college of priests at Halsted before the Reformation; the foundation was for eight, but it is doubtful there was ever the full number. The revenue at the dissolution was 26*l.* 5*s.* 8*d.* per annum gross, or 23*l.* 16*s.* 5*d.* clear.

There were in Halsted, according to the returns made to parliament for 1833, ten infant or dame schools, with 150 scholars; four day-schools, one supported by voluntary contributions, containing 40 children, and three others with 100 children; and four Sunday-schools, with 695 scholars. There is a grammar-school, founded by Dame Mary Ramsey, for 40 poor children of Halsted and Colne Engaine (a neighbouring parish), which is not distinctly mentioned in the return.

'At a house in this parish is a Greek inscription, brought from a village near Smyrna, where it was erected one hundred and fifty years before Christ, to the honour of Crato, a musician.' (*Beauties of England and Wales*, 1803.)

Near Halsted are the remains of the antient manor-house of Stansted Hall.

Manningtree is in the hundred of Tendring, on the æstuary of the Stour, 60 miles from London, through Chelmsford and Colchester. This place was antiently known by the name of Sciddinchou; the origin of its present appellation, formerly written Many-Tree, is not known. It is a small place, irregularly laid out. The church or chapel, built out of the ruins of a more antient one, which stood on a site not far removed from that of the present building, was formerly very small, but has been lately enlarged. There are meeting-houses for Independents, Quakers, and Methodists.

The parish, or rather the chapelry, by the return of 1831, comprehended only 30 acres, and had 241 inhabited houses, and a population of 1237, a very small proportion of which was agricultural. Manningtree appears to be the residence of an unusual proportion of genteel families. A considerable trade in malt is carried on; and corn, coal, deals, iron, and fish are imported. The market is on Thursday.

The living is a perpetual curacy, united with the rectory of Mistley (of which parish the chapelry of Manningtree is a dependency) and the vicarage of Bradfield. The whole are of the yearly value of 698*l.*, with a glebe-house. They are in the archdeaconry of Colchester.

The chapelry contained, in 1833, one national school, containing 223 children; and one Sunday-school, with 60 children.

Mistley is adjacent to Harwich. Mistley Hall, the seat of the Rigby family, is on a pleasant eminence in the midst of gardens and plantations elegantly laid out. On the bank of the Stour is a quay with warehouses, at which considerable trade in corn, malt, and coal is carried on. These belong to the proprietor of the mansion.

Ongar, distinguished as Chipping Ongar from another parish of the same name (High Ongar), is in Ongar hundred, near the right or west bank of the Roding, and the left or east bank of the Cripsey brook, just above the junction of these two streams: it is 21 miles from London by Woodford bridge, Chigwell, and Abridge; or 24 miles by Epping.

A castle was built here by Richard de Lucy, one of the principal nobles of the time of Henry II.: the keep stood on the summit of a lofty artificial mound. The castle having become very ruinous, was, in the time of Queen Elizabeth, pulled down, and a brick house was built by the then owner of the place on the site of the keep. This house was demolished in 1744, and a large summer-house, of castellated architecture, built in its room. The moat which surrounded the keep, and other earthworks of the castle, still remain. The sides of the mound are planted with trees and shrubs.

The town chiefly consists of one long and wide street, extending from the bridge over the Cripsey brook, up the slope and along the brow of a hill. The church, which is in a central situation, is a small neat structure: the windows are remarkably small, so as to resemble the loop-holes of a castle. The church contains a monument of Jane, one of the daughters of Oliver Cromwell. Many Roman bricks have been worked into the building, and the foundations of Roman buildings are said to have been dug up in the churchyard. The principal road from Londinium (London) to Camulodunum (Colchester) is supposed by some to have passed this way, though others make it pass near or through Romford and Chelmsford. The town is within the area of an antient entrenchment, which may still be traced on its different sides. It was antiently called Ongar ad Castrum, perhaps with reference to this entrenchment. There is an Independent meeting-house.

The area of the parish is 480 acres: the number of inhabited houses in 1831 was 134, and the population 798, of which a small proportion is agricultural. The market is on Saturday.

The living is a rectory in the archdeaconry of Essex, of the yearly value of 127*l.*, with a glebe-house.

There were in 1833 nine boarding or day-schools, with 140 scholars; and two Sunday-schools, containing 95 children. One of the day-schools is endowed.

High Ongar, which is on the other side of the Roding, is a much larger parish than Chipping Ongar, and had, in 1831, a population of 1205, chiefly agricultural.

Rochford is in Rochford hundred, on the Broomhill river, which is navigable to within about a mile of the town, 40 miles from London through Romford, Brentwood, and Billericay. The town consists principally of two streets running one into the other in the form of the letter T: the houses are ill built; the market-house, which is of timber, stands

near the centre of the town, and has on it the date 1707: it is not used as a market-house now. There are two bridges over the river, which close to the town is an inconsiderable brook. The church, which is a little removed from the town, is a good-sized building, consisting of nave, chancel, and side aisles, with a lofty brick tower at the west end. There is an Independent meeting-house. At the lower end of the town are a row of brick almshouses for six poor people, founded and endowed by Robert Rich, earl of Warwick, in the early part of the seventeenth century.

The parish comprehends an area of 1240 acres: it had, in 1831, 271 inhabited houses, and a population of 1526, of which more than a third was agricultural. The chief trade is in corn. The market is on Thursday.

The living is a rectory, in the archdeaconry of Essex, of the yearly value of 570*l.*, with a glebe-house.

There were in the parish, in 1833, a Lancasterian school, with 70 boys; a national school, with 64 children (rather more on Sunday); seven other day-schools, with 158 scholars; and one Sunday-school, with 100 children: to the Sunday-school a lending library is attached.

Romford is in the liberty of Havering atte Bower, on the Bourne brook: it is a great thoroughfare, being on the high road from London to Chelmsford, Colchester, Ipswich, Bury, Norwich, Yarmouth, and other large towns in Essex, Suffolk, and Norfolk; between 11 and 12 miles from London. The derivation of the name has been much disputed, some contending that it is derived from Roman ford, others from two Saxon words signifying 'broad ford.' This place, or some spot in the neighbourhood, is supposed to be the site of the Durolitum of the Itinerary of Antoninus.

The town consists almost entirely of one long wide street, near the centre of which is the market-house and town-hall, which was repaired in 1768 at the expense of the crown. The houses are tolerably good, and the street is paved and lighted. The chapel, situated at the entrance to the town from London, on the left hand, is a tolerably large building, erected in the early part of the fifteenth century: it is dedicated to the Virgin Mary and St. Edward the Confessor, and consists of a chancel, nave, and north aisle, with a square tower at the west end. In the east window is a figure of Edward the Confessor in stained glass, the arms of that king, and another coat of arms. The Independents have a meeting-house at Collier's Row, a hamlet of the parochial chapelry of Romford, about two miles north-west of the town; a house for the pastor and a small endowment are connected with it. There is also a Methodist meeting. An almshouse for five poor men was founded and well endowed by Roger Reed near the end of the fifteenth century. There were formerly cavalry barracks at the London entrance to the town: they were of wood, and have since been pulled down.

The parish comprehends an area of 3340 acres, and had, in 1831, 766 inhabited houses, and a population of 4294, of which less than one-third is agricultural. The general market is on Wednesday: there is a market on Monday for calves, and on Tuesday for hogs. In spring and summer great numbers of suckling calves are brought to market from Suffolk and the dairy districts of Essex.

This parish, with those of Hornchurch and Havering, form the liberty of Havering atte Bower, the quarter sessions for which are held at Romford. Commissions for trying felons within this liberty may be obtained by a small payment to the crown, but no commission has been applied for for many years. (Lysons' *Environs of London.*)

The living is a chapelry originally included in the parish of Hornchurch, the limits of which were once coextensive with those of Havering liberty, but separated from it by act of parliament, A.D. 1658. The living is of the annual value of 800*l.*, with a glebe-house, in the patronage of New College, at Oxford: it is in the archdeaconry of Essex. There were, before the Reformation, a chantry and a small guild attached to Romford chapel, the lands of which were valued at 4*l.* 10*s.* 2*d.* per annum.

There were, in 1833, in the parish, one endowed day-school with 121 scholars, six other day-schools with 172 scholars, and two Sunday-schools with 143 scholars.

Walden or Saffron Walden is in the hundred of Uttlesford, which occupies the north-western extremity of the county: it is near the Cam, and a little to the right of the road from London to Newmarket and Norwich, 42 miles from London. It was conjectured by Doctor Stukely, but without sufficient authority, that this was a Roman station. Its name is derived from two Saxon words, Wealb, a wood, and ben, a valley: its epithet 'Saffron' is derived from the great quantity of that plant formerly cultivated in the neighbourhood: this cultivation has been long abandoned. At the period of the Domesday survey the lordship of Walden was possessed by a Norman, Geoffrey de Magnaville, one of the companions of the Conqueror. This nobleman erected at Walden a castle, which, judging from the remains of it, must have been of great strength. The remains occupy the highest part of the town, and consist of some parts of the walls and towers, built with flint bound together by a very hard cement. Geoffrey, the grandson of the founder of the castle, having deserted the party of Stephen for that of the Empress Maud, obtained of her permission to remove the market from the neighbouring town of Newport (now a village) to Walden. Having been however seized by Stephen, he could only obtain his freedom by the delivery of his castles, Walden being one of them, to the king. The same nobleman founded here in 1136 a Benedictine priory, which was some years later raised to the rank of an abbey: this abbey obtained several valuable benefactions, and had, at the time of the dissolution, a yearly revenue of 406*l.* 15*s.* 11*d.* gross, or 372*l.* 18*s.* 1*d.* clear. The site was granted to Sir Thomas Audley, lord chancellor, and the title of Lord Audley of Walden was conferred upon him. On the site and grounds of the monastery, enlarged by a subsequent addition of 200 acres, stand the present mansion and park of Audley End.

The town is irregularly laid out, and the houses are many of them of considerable antiquity. The church is 'a large and very elegant specimen of the late Perpendicular style. It has a nave and aisles, large south porch, and chancel and aisles. The clerestory windows of the nave are very large and of six lights; those of the chancel, which has a lower roof, are much smaller, and two in each arch. The eastern end of the nave is finished by two octagonal turrets with crocketted ogee heads. The windows of the aisles are very large, filling up the spaces close to the buttresses, and they are mostly square-headed. The tower has bold buttresses, crowned with octagonal turrets, and very long plain pinnacles. These pinnacles and the spire, which is of wood covered with lead, appear to be of later date than the church. The interior of this church is very fine, the piers being remarkably light and elegant.' Rickman's *Essay on Gothic Architecture.* Since the above extracted account was written the wooden spire has been replaced by one of stone more in character with the rest of the building. There are two places of worship for Calvinistic or Particular Baptists, and one for Arminian or General Baptists, and one each for Independents, Quakers, and Wesleyan Methodists. The town-hall is a neat building in the market-place, which is spacious. There are a cattle-market and a handsome range of almshouses lately built in the place of a former range founded and endowed by Edward VI. for 16 decayed housekeepers of each sex. There is also a neat building lately erected near the ruins of the castle for a museum, and for the meetings of a literary society established in the town. Audley House, or as it is usually termed, Audley End, the seat of Lord Braybrooke, is a noble mansion erected by the Earl of Suffolk, who in the time of James I., had inherited the estate of the Lord Chancellor Audley. The grounds are beautiful, and the Cam, which flows through them, though here an inconsiderable stream, expands so as to form a considerable sheet of water in front of the house. The mansion, originally more extensive than at present, is still one of the finest in the county; it is said to have cost at its erection 190,000*l.* The house contains some interesting portraits and other pictures. On a green near the town is a singular remain of antiquity called the Maze. It consists of a series of concentric circles with four outworks cut in the chalk, which here rises to the surface. Its origin and use are unknown: Dr. Stukely conjectures that it was a British cursus or place of exercise for the soldiery. A short distance from the town are the remains of an antient encampment of an oblong form called Pell Ditches or Repel Ditches. The south bank is 730 feet long, 20 high, and 50 broad at the base, and 6 or 8 wide at the top: the west bank is 588 feet long: both banks and ditches are extremely bold and well preserved.

The parish of Saffron Walden contains 7380 acres, and had in 1831 941 inhabited houses and a population of 4762, of which about one-fourth was agricultural: there are

many genteel families in the town. The chief trade is in barley and malt: the market is on Saturday. Walden is a municipal though not a parliamentary borough. By the Municipal Reform Act the corporation consists of a mayor, four aldermen, and twelve councillors. The borough is co-extensive with the parish.

The living is a vicarage in the archdeaconry of Colchester, of the annual value of 237*l.*, with a glebe-house. Lord Braybrooke is patron and impropriator.

There were in Walden in 1833 one infant school with 70 children: two national schools, containing 124 boys and 106 girls (with the addition of 10 boys on Sundays); a school for 25 boys and as many girls, chiefly supported by Lord Braybrooke; and six other day-schools with 212 children; and two Sunday-schools with 289 children.

Waltham Abbey, or Holy Cross, is in the half-hundred of Waltham, 12½ miles from London, a little to the right of the road to Ware, Royston, and Huntingdon. It is on the river Lea (which is here separated into several channels, some of which flow through the town) near the junction of the Cobbin brook, which flows a short distance from the town on the east and south.

The first notice of Waltham occurs in the reign of Canute, whose standard-bearer, Tovi, founded here a religious house with two priests, probably secular canons of St. Augustine. The place derived sanctity and name (Holy Cross) from a cross with the figure of Christ upon it found at Montacute and transferred here, to which miraculous powers were ascribed. Harold, afterwards king of England, enlarged the foundation of Tovi, A.D. 1062, furnished it with ample endowments, increased the number of canons to 12, one of whom had the rank of dean, rebuilt the church, and established such a school of learning as the state of the age admitted. When the unfortunate Harold fell in the battle of Hastings, A.D. 1066, his body, which had been given up to his mother, was brought to Waltham for interment and his tomb erected. William the Conqueror treated the religious of Waltham harshly, and deprived them of their moveable valuables, but left their lands untouched or nearly so. In the reign of Henry II. (A.D. 1177) regular canons were substituted for seculars, the number enlarged to 16, the endowments of the establishment augmented, and the dignity of abbot conferred upon the head of it. Subsequent monarchs favoured the establishment: Henry III. frequently resided in the abbey, and granted to the inhabitants of the village the privilege of a market and a fair. Some accounts make the market more antient. In the reign of this king, A.D. 1242, the conventual church was again solemnly dedicated, the king and several of his nobles being present. The yearly revenues of the abbey at the dissolution were 1079*l.* 12*s.* 1*d.* gross, or 900*l.* 4*s.* 3*d.* clear.

The town consists principally of one main street, running nearly east and west. The church, formerly part of the conventual church, is on the north side of the main street, near the centre of the town. As the conventual church it was very extensive, consisting of nave, transept, choir, and chapels. At the intersection of the transept, which may still be traced, rose the great tower, which contained a ring of five bells. Part of this tower having fallen in, the remainder was blown up by underminers, and the whole choir, tower, transept, and east chapel demolished. The nave and some adjacent chapels alone remained: the nave, with its side-aisles, forms the body of the present church. The extent of the original fabric may be estimated by the fact, that Harold's tomb, which was in the choir or in a chapel beyond it, stood about 120 feet eastward from the termination of the present building. The church is about 90 feet in length, and in breadth, including the side-aisles, 48 feet: it is in the Norman style, with round massive piers (some of which have indents of wave and zig-zag lines), dividing the nave from the side-aisles; semicircular arches, and zig-zag enrichments. The great arch of the cross, now walled up, is a very fine one. Above the arches dividing the nave from the side-aisles are two other ranges or tiers of arches: those of the second tier correspond in width to those of the lower, but are not of equal height; the arches of the third tier are three to each arch of the lower tiers, with a window pierced in the middle arch of the three. The roof is modern, and little ornamented. The side-aisles are surmounted with galleries, erected about half a century ago. At the west end of the church is a heavy square embattled stone tower, 86 feet high, bearing the date 1558. From the south side of the church projects the Lady Chapel, now used as a vestry and school-room, under which is a fine crypt. Another little chapel, at the south-east end of the church, is now a repository for rubbish. These chapels have some beautiful and well-executed portions in the Decorated English style. There are in the church various inserted windows of different dates. The font is apparently very antient, and there is a fine wooden screen. The building has been much injured and its beauty deformed by dilapidation and alterations, but it is still well worthy of attention.

Exclusive of the nave of the abbey church, the remains of the abbey are but few. They consist of an entrance-gateway, and bridge across an arm of the Lea, which bounds the enclosure of the abbey on the west side; some walls, and a few vaulted arches in a garden belonging to the abbey farm. The refectory is reported to have stood eastward of the church; and what is now the abbey farm is said to have been antiently the stables. The gateway is in a much later style of architecture than the church. In the gardens formerly belonging to the abbey, now occupied as a nursery-ground, is a tulip tree, reported to be the largest in England. There are at Waltham Abbey meeting-houses for Baptists and Wesleyan Methodists.

The parish of Waltham Abbey is extensive, comprehending 11,870 acres: it had, in 1831, 760 inhabited houses, and a population of 4104; but of these 344 houses and 1902 inhabitants were in the three hamlets of Holyfield, Sewardstone, and Upshire; leaving for that part of the parish which contains the town 416 houses and 2202 inhabitants: only a small proportion of the population of the town division is agricultural; but the greater part of the population of the hamlets is so. The powder-mills belonging to government employ many hands: many are engaged in the printing of silk handkerchiefs, and some in the manufacture of pins: some also, though not in the town division, are engaged in throwing and spinning silk. The market is on Tuesday.

The living is a donative curacy, in the peculiar jurisdiction of the bishop of London: it is of the annual value of 237*l.* There is an almshouse for eight poor widows.

There were in the year 1833 one infant school, with 135 children: three day-schools, viz., one endowed for 20 boys and 20 girls, one national school for 60 girls, and a school with 24 boys at High Beach, besides many small private day-schools; one evening-school, supported by voluntary contributions, with 42 boys; and four Sunday-schools, with 310 children.

Witham is in the hundred of Witham, and on the high road from London to Norwich by Ipswich, 38 miles from London. It is on Pod's Brook, just above the junction of that stream with the Blackwater.

This town is generally reputed to have been built by Edward the Elder, but it is questionable if that prince did more than restore a place that bears marks of having been a Roman station. On Cheping Hill or Chipping Hill are the remains of a circular camp, with a double vallum. A quantity of Roman bricks are worked up in the tower and body of the church, and one or two Roman coins were discovered in levelling the fortifications of the above-mentioned camp. From these indications it has been supposed that Witham was the Canonium of Antoninus, which is placed by others near Kelvedon.

The town consists of two portions: the larger portion consists of one main street along the high road and a short street or two branching from it: the other portion, in which is the church, is situated half a mile to the north of the principal part, on Cheping Hill, mentioned above. There is no kind of manufacture carried on; but the trade of the place arises from the wants of the neighbourhood, and its situation on a great public thoroughfare. Several genteel families reside in the town; and a mineral spring, Witham Spa, attracted some years since, and perhaps still attracts, visiters in the summer. The church is a tolerably large building, containing some antient monuments. There are places of worship for Independents, Baptists, Quakers, and Catholics; and several almshouses, but none very extensive or richly endowed.

The parish comprehends an area of 3280 acres; and had, in 1831, 552 inhabited houses, and a population of 2735, of which less than a fifth was agricultural. The market is on Tuesday.

The living is a vicarage, in the archdeaconry of Colchester, of the yearly value of 473*l.*, with a glebe-house, in the gift of the bishop of London.

There were, in 1833, fifteen day schools with 361 children; two boarding schools with 40 girls; and one Sunday school with 200 children, and a lending library attached. Of the day-schools, one (for 100 boys and 50 girls) is partly supported by an endowment; another (for 70 girls) partly by voluntary contributions.

Faulkbourn hall, not far from Witham, is an antient manor house, different parts of which have been erected at very different periods. A tower gateway of curious architecture is supposed to be as old as the time of Stephen.

Beside the above market-towns, there are several villages which are of sufficient importance to call for notice. The following were formerly market-towns, and some of them still retain their place as market-towns in many of our common maps:—Great Bardfield, Brentwood, Dedham, Harlow, Hatfield, Horndon, Ingatestone, Leigh, Thaxted, and Rayleigh.

Great Bardfield is in the half hundred of Freshwell or Freshwell, on the south bank of the Pant or Blackwater, over which it has a strong brick bridge. In the south aisle of the church are some coats of mail, &c., said to have belonged to the Lumley family. The population, in 1831, was 1029, about half of them agricultural. The market has been long given up.

Brentwood is on the road to Chelmsford and Colchester, 18 miles from London and 11 from Chelmsford. Some Roman antiquities have been found in the neighbourhood. The assizes for the county were formerly held here. The place consists chiefly of one main street along the high road, with irregular and mean houses: from its situation on a great thoroughfare, it has many public houses and inns. There are the remains of the old prison and town hall, the tenants of which are bound to put them in repair if ever the assizes should be held in the place again. There is an antient chapel in the town (for Brentwood is only a chapelry in the parish of South Weald, and the living a perpetual curacy, worth 124*l.* a year, with a glebe-house, in the archdeaconry of Essex), founded about the year 1227, by the prior of the monastery of St. Osyth, for the tenants of a manor belonging to that monastery: this chapel is a small building, dedicated to St. Thomas à Becket, of whom it contains a rude image carved in wood. There is an endowed school. Races are held in the neighbourhood; and at Warley, not far off, are cavalry barracks. The area of the chapelry is 730 acres: the population, in 1831, was 1642. The market has not been discontinued many years. There are two yearly fairs, at which a great number of cattle are usually sold: it is one of the fairs from which the farmers of 'the hundreds' obtain their live stock.

Dedham is in Lexden hundred, on the south bank of the river Stour, just on the right hand of the road to Ipswich and Norwich, about 58 miles from London. In the reign of Richard II. this place was famous as one of the seats of the clothing trade. It is situated in a picturesque valley, and is a small place, consisting chiefly of one street. The church is a large building in the Perpendicular style of English architecture: it has a fine tower at the west end with octagonal turrets crowned with rich pinnacles. There is a bridge over the Stour. The population of the parish, in 1831, was 1770, about half agricultural: many genteel families reside in the place. There is an endowed free grammar school for 40 boys; and an English school, partly endowed, with more than 60 scholars; and a number of private schools. The living is a vicarage worth 170*l.* per annum, with a glebe-house: the rectorial tithes form the foundation of a lectureship connected with the church. The Rev. W. Burkitt, author of a well known commentary on the New Testament, was lecturer here.

Harlow is in the half hundred of Harlow, just beside the road by Newmarket to Norwich, rather more than 23 miles from town. The village is about a mile from the river Stort. It was formerly the seat of a large woollen manufacture and of a considerable trade. The church is in a central situation, and is of tolerable size: it was originally in the form of a cross, with a central tower rising from the intersection of the transepts: this church was much injured by fire in 1711, and upon its restoration a cupola was substituted for the tower: the church is adorned with much painted glass. There is a place of worship for Baptists, several almshouses, and a charity school.

At Harlow Bury, a mile north of the village, is a large antient chapel, used as a barn or farm-office. It has a fine semicircular-headed door, the shafts of which have small capitals like those of the Galilee at Durham. There are some small windows with round heads and others with pointed heads.

The parish of Harlow contains 4490 acres, and had in 1831 a population of 2101, above half agricultural. There are three considerable fairs in the year for horses and cattle: the second, held on Harlowbush Common, two or three miles south of the village, is the most frequented: horses for all purposes, black cattle and other live stock, and wool, are brought for sale, and the fair attracts a concourse of people for fifteen or twenty miles round, and even from the metropolis. The living is a vicarage, of the yearly value of 383*l.*, with a glebe-house, in the archdeaconry of London.

A large sum of money (8000*l.*), bequeathed by Mr. Geo. Fawbert, has been vested in trustees for the establishment of a day school and library at Harlow, and for apprenticing or otherwise advancing in the world those educated at the school.

Hatfield is in the half hundred of Harlow, on the road from London by Harlow to Dunmow, 30 miles from town: it is on the Pincey brook, which flows into the Stort. This place was formerly part of the royal demesne, from which circumstance it obtained one of its distinguishing epithets, Hatfield Regis: its other designation of Hatfield Broad Oak it obtained from a large oak supposed to have flourished here in the Saxon times. A portion of this tree (if we may trust the accuracy of Mr. Arthur Young's statement) was yet remaining in Hatfield Forest, a mile or two north of the town, when that gentleman published his agricultural survey of Essex, in which an engraving of this venerable tree is given. Aubrey de Vere founded, A.D. 1135, a Benedictine priory at Hatfield supposed to have been at first a cell of the abbey of St. Melanius Redonensis, at Rennes or Rédon, in Bretagne, but subsequently rendered independent. The possessions of this priory at the suppression were estimated at the yearly value of 157*l.* 3*s.* 2*d.* gross, or 122*l.* 13*s.* 2*d.* clear. The parish, which is very large, had in 1831 a population of 1825, chiefly agricultural. The church has a western tower and a large porch in the Perpendicular style, and other parts are of a character betokening a more antient date. The Methodists have a place of worship. The living is a vicarage, worth 210*l.* a year, with a glebe house, in the archdeaconry of Middlesex.

Horndon, distinguished from two other parishes of the same name by the epithet 'on the hill,' is in Barstable hundred, and is situated, as its name imports, on an eminence, from whence there is a fine view. The church is in the middle of the town; it has a stone tower, embattled. The parish had in 1831 a population of 511, chiefly agricultural. The market, when Morant published his history of Essex (1768), was very small; it has been since given up. There is one fair in the year, chiefly for wool. It is 27½ miles from London through Brentwood.

Ingatestone is in the hundred of Chelmsford, and on the road from London to Chelmsford, 23 miles from London. It is supposed to have derived its name from a Roman military stone, and from the Saxon word Ing, a meadow; thus, Ing-atte stone. The village, which extends into the adjoining parish of Fryerning, consists of a long street along the high road, and a smaller street running out of this to the south-east. From its situation on so great a thoroughfare it abounds with inns. It had formerly a large cattle market, but this is now discontinued: there is a large cattle fair. The church is in the middle of the town, and contains several monuments of the Petre family. There is an almshouse and an Independent meeting-house. Ingatestone Hall, a little way south of the town, was once the seat of the Petre family: it is a very antient and irregular pile. The grounds are well stored with fish-ponds, and the whole was formerly surrounded by a park. The population of the parish, which is small, was in 1831 789, chiefly agricultural: to these we may add perhaps 300 for that part of the village which is in Fryerning parish. It may be observed that the syllable Ing (or Ging, which appears to be a variety of it), which enters into the name Ingatestone, is found in the names of several other parishes or manors in this neighbourhood, as Fryern-ing, Margarett-ing, Mountneys-ing, Ginges-joiberd (commonly called Buttsbury), Ingrave or Ging-ralph, and Trestl-ing or Thrust-ing: to which we may add Bark-ing.

Raleigh or Rayleigh is in Rochford hundred, 34 miles from London. It was, at the time of the Domesday survey, one of the numerous lordships of Suene, who, having joined the Conqueror at an early period, was allowed to retain his possessions. He built a castle here, of which some earthworks yet remain, consisting of a mound with an oval base, surrounded by a double ditch and embankments. The village stands on an eminence, and has, at the upper end, the church, an edifice principally in the Perpendicular style, with some portions of an earlier date: the tower has a short spire and a staircase turret battlemented. The Baptists have a place of worship here. When Morant wrote, a weekly market was held at Rayleigh: it is now given up. There is a cattle fair. The population of the parish in 1831 was 1339, chiefly agricultural. The living is a rectory of the yearly value of 774*l*., with a glebe-house, in the archdeaconry of Essex.

Thaxted is in the hundred of Dunmow, 44 miles from London by Harlow, Hatfield Broad Oak, and Dunmow. This is a very antient place, and probably existed in the time of the Saxons. It was incorporated by charter of Philip and Mary, and its government vested in a mayor, bailiffs, and chief burgesses; but the corporation became extinct in the time of James II., the corporate officers having retired from their offices on being served with a *Quo Warranto*. The town is irregularly laid out; its chief ornament is the church, which is in the centre of the town, and is one of the finest in the county It is mostly in the Perpendicular English style, and consists of a nave and chancel with side aisles, transept, and tower at the west end. The nave is not so wide as either of the side aisles, from which it is separated by eight clustered pillars on each side with pointed arches. The windows are mostly large, and many of them are ornamented with tracery and painted glass, but the latter is much broken and otherwise defaced. The north and south porches are richly ornamented with sculpture. The tower is sustained by buttresses, and is embattled, and terminated with a very rich crocketted spire, supported by flying buttresses. Most of the buttresses of the aisles have fine pinnacles, and are enriched with panneling. The height of the tower and spire is 183 feet, which is also the length of the church: the breadth of the church is 87 feet. It is supposed to have been built in the fourteenth century. There are at Thaxted meeting-houses for Quakers, Independents, and Baptists. There is a free grammar-school, which contained, in 1833, 30 boys on the foundation and 30 others whose education was paid for by their parents. Upon the same foundation 20 girls were educated at another school.

The population of Thaxted parish (which comprehends 6890 acres) was, in 1831, 2293, more than half agricultural. The living is a vicarage, in the archdeaconry of Middlesex, of the yearly value of 450*l*., with a glebe-house. The market, which had been long disused, was revived about the close of the last century, but was not much attended, and has since been again discontinued. There are two fairs in the year. There are several almshouses in the place, and the benefactions to the poor have been very considerable. Near Thaxted is the antient hall, Horeham-hall, the seat of Sir William Smith: it is a castellated gothic mansion partly covered with ivy.

Beside the above, which have been market towns, there are several other villages which, from their importance, call for notice.

Ashdon, the parish of which, including the hamlet of Bartlow End, had, in 1831, a population of 1103, is in the half hundred of Freshwell, three miles from Saffron Walden. It is supposed by some to have been the scene of a dreadful battle fought between Edmund Ironside and Canute; but the battle was more probably fought at Assingdon in the hundred of Rochford. At Bartlow hills, in the parish of Bartlow, Cambridgeshire, two miles north of Bartlow church, four contiguous barrows have been regarded as the tumuli raised over those who were slain in this battle, but this rests on tradition only.

Brightlingsey (population in 1831 1784) is on the æstuary of the Colne, in Tendring hundred. The inhabitants are engaged in the oyster fishery. The parish forms a peninsula, surrounded by the marshes of the Colne and its inlets, except on the north-east side, where is the only entrance to the parish, except by a ford. The church is near this entrance, the village is a mile distant nearer the sea. Morant speaks of an establishment for preparing copperas here, and the 'copperas house' is marked in the Ordnance Survey. Brightlingsey is a member of Sandwich in Kent, one of the Cinque Ports. The population has nearly doubled within the present century.

Burnham is in Dengie hundred, on the north bank of the æstuary of the Crouch, which has here a depth of water sufficient for a ninety-gun ship. It had a good street towards the river and a commodious quay. The church is nearly a mile from the village. The population, in 1831, was 1393: the inhabitants are engaged in the oyster fishery.

Chigwell lies between Epping and Henhault forests: from Chigwell Row, on the border of the latter, a most extensive view is obtained over the south of Essex and the Thames into Kent. There is an endowed grammar-school which, in 1833, had six scholars, and another endowed school with sixty boys. Population in 1831, 1815.

The Hams are in Becontree hundred, and in the immediate neighbourhood of London. West Ham parish occupies the south-west corner of the county, and is bounded by the Thames and the Lea, by which it is respectively separated from the counties of Kent and Middlesex. It is divided into four wards: All Saints, Church Street, Plaistow, and Stratford. West Ham had formerly a market, the charter for which was procured in the thirteenth century. There was formerly at Stratford Langthorn, in this parish, an abbey for Cistertian monks. The abbey having become dilapidated from the flooding of the marshes, amid which it was built, the monks were removed to Burgestede (now Burstead), near Billericay, until 'one of the Richards, kings of England,' (probably Richard II.) repaired the abbey and brought the monks into it again. In 1307 the abbot was summoned to parliament. At the dissolution the yearly revenues of this house were estimated at 573*l*. 15*s*. 6*d*. gross, or 511*l*. 16*s*. 3*d*. clear. The chief remains now existing of the conventual buildings are a brick gateway, the entrance to the precincts, and an ornamented arch in the Early English style, which appears to have been the entrance to the chapel: they are nearly half a mile south-west of the church. The site of the precincts was moated and contained about sixteen acres. West Ham church consists of a nave and chancel, and side aisles to both: it is large, but not distinguished for its architecture.

Stratford, which is one of the wards of this parish, lies along the road to Romford, Chelmsford, &c., and may be regarded as a prolongation of the suburbs of the metropolis, being joined to it by an almost continuous line of buildings, constituting the village of Bow, and the hamlet of Mile End in Middlesex. A new church has been lately erected here. The Newmarket road branches off from the Chelmsford and Colchester road at Stratford.

The population of West Ham parish was in 1831 11,580, of which less than one-sixth was agricultural. A considerable number of the inhabitants are labourers, employed in the East and West India docks at Poplar and Blackwall. Calico and silk dyeing and printing are extensively carried on: chemicals are manufactured, and porter is brewed. The West Ham water-works supply the eastern suburbs of the metropolis with water. Several of the wealthier inhabitants of London have residences at West Ham.

The living of West Ham is a vicarage, in the archdeaconry of Essex, and in the gift of the crown: its yearly value is 875*l*. There are several dissenting meeting-houses.

There were in this parish in 1833 two infant schools, partly supported by contributions, with 150 children; three endowed day-schools, with 257 children, some of whom were clothed; a national school, partly supported by endowment and subscription, with 50 boys; a school with 40 children, supported by contribution by Roman Catholics; another of 10 children, supported by Dissenters; and another school of 120 children, partly supported by contributions; and four Sunday-schools, with 390 children. There were also many private boarding and day schools, containing 488 children.

East Ham parish joins that of West Ham. The church consists of a nave with two chancels; the upper chancel, which forms the eastern extremity of the church, is semicircular at the east end, and has narrow pointed windows. Part of the walls of the nave and lower chancel are in the Norman style, as is the lower part of the tower; but the

windows of the nave are of later date, and some of them modern. In the church is a monument of Edmund Nevill, Lord Latimer. Dr. Stukely, the antiquary, is buried in the churchyard, but, at his own desire, without any monument. At Green Street, a hamlet of this parish, is an antient mansion, supposed to have been the residence of the Nevill family. The population of East Ham in 1831 was 1543, chiefly agricultural. There is an almshouse for three poor men, and a place of worship for Wesleyan Methodists.

The Hedinghams are in Hinckford hundred, and on a road branching off from the Bury and Norwich road at High Garrett, two or three miles beyond Braintree, and reuniting with it at Bulmer Tye, a little before it quits this county for Suffolk. They formerly constituted one parish: from the time of Henry III. they appear as two; Sible Hedingham, on the south-west bank of the Colne, 48 miles from town; and Castle Hedingham, on the north east bank of the river, one mile farther. We subjoin the following particulars respecting them.

Sible Hedingham, area 5490 acres. Population in 1831 2194. Living, a rectory in the jurisdiction of the Commissary of Essex and Herts, concurrently with the consistorial court of the bishop of London, of the yearly value of 905*l.*, with a glebe-house. Castle Hedingham, area 2600 acres. Population in 1831 1220. Living, a donative in the archdeaconry of Middlesex, of the yearly value of 129*l.* The population of these places is more than half agricultural.

Sible Hedingham church is a neat and tolerably spacious building, supposed to have been erected in the reign of Edward III. There was formerly a chantry here, founded by the executors of Sir John Hawkwood, whose monument, now demolished, stood in the church: the house of the chantry priest is still standing; it had been originally built for the reception and entertainment of devout pilgrims, and still retains the name of the hostage. The castle, which gives name to the parish in which it stands, was built by the De Veres, to which family the lordship of Hedingham was given by the Conqueror. Its architecture, which is very similar to that of Rochester Castle, leads to the supposition that it was erected about the same time as that fortress, viz., towards the close of the eleventh or the beginning of the twelfth century. Maud, wife of king Stephen, is said to have died here. In the civil wars of the reign of John, it was held by Robert de Vere, earl of Oxford, for the barons, and was taken A.D. 1216 by the king. it was retaken in the beginning of the reign of Henry III. by Louis, dauphin of France, but recovered by the earl of Pembroke, governor to the young king. In the reign of Henry VII. that prince was sumptuously entertained here by John de Vere, earl of Oxford, who had suffered severely for his attachment to the Lancastrian cause, and had been one of the chief instruments in placing the crown on Henry's head. As the king was departing, he observed that the earl, to do him honour, had put liveries on his retainers, and in return for his hospitality compelled him to compound by a fine of 15,000 marks for breaking a statute, recently passed, forbidding such a practice. The De Veres retained the castle until A.D. 1625. It has since passed through various hands. The keep is the only part remaining; it is one of the finest and best preserved Norman keeps in the kingdom. The walls are above 100 feet high, and from 11½ to 12½ feet thick at the bottom, and from 9½ to 10 feet thick at the top: the eastern wall is at least a foot thicker than the others, having been so built, it is conjectured, in order to withstand the violent easterly winds. The building is a parallelogram, of 55 feet on the east and west sides, and 62 feet on the north and south. At each angle on the top there was formerly an embattled turret; two of the turrets are remaining: the parapet, now destroyed, was also embattled. The castle is built with irregular flints or stones, imbedded in grouting or fluid mortar, and is cased on the outside with squared stone very neatly and regularly put together. It has five stories, including the ground-floor and platform: the principal entrance is on the first story, and on the west side, with a flight of stairs leading up to it: entrances to the ground-floor were made with great labour in 1720 by the proprietor, who wished to convert that floor into an outhouse. The whole building is worthy of attention; it has some fine Norman enrichments in the interior. Castle Hedingham church is an antient fabric of stone with brick battlements, partly in the Norman and partly in the Early English style: the tower is of much later date. In the chancel is a superb, but somewhat mutilated monument of John de Vere, earl of Oxford, who died A.D. 1539. A Benedictine nunnery was founded here by the first earl of Oxford and his wife, A.D. 1190. Its revenues at the dissolution were valued at 29*l.* 12*s.* 10*d.* The nunnery, long since converted into a farm-house, and part of the chapel belonging to it, are yet standing. There was also an hospital for the sick and decrepit poor at Hedingham, attached to which were two or three chaplains with a clerk and servant. This hospital has long been destroyed: it was on the south-east side of the castle.

Leigh is in the hundred of Rochford, about 36 miles from London. The houses are principally arranged in one street running along the foot of an eminence and on the bank of the Thames. The summit of the eminence commands a fine prospect, and is crowned by the church with its ivy-mantled tower, and the manor-house. The population (1254 in 1831) consists chiefly of fishermen. The place has some trade, and there is a small customhouse here. The Wesleyan Methodists have a meetinghouse. Some Roman coins have been discovered at Leigh.

Leyton, or Low Leyton, derives its name from the river Lea, near to which it is situated; it is in Becontree hundred, about 5 miles from London. It had in 1831 a population of 3323, of which less than one-third was agricultural. The village contains several residences of London merchants and tradesmen. The church is pleasantly situated, overlooking the marshy valley of the Lea, but possesses no beauty of architecture. Among the tombs in the chancel is that of the historian and antiquary John Strype, who was vicar of the parish for nearly seventy years. Leytonstone is a hamlet of this parish. It was supposed by Camden that Leyton was a Roman station, the Durolitum of Antoninus; but though the name as interpreted by some (according to whom Durolitum signifies 'the water of Ley') gives countenance to the supposition, it does not accord with the distances of the *Itinerary*. Roman and other antiquities have been however found at Leyton in considerable number: such as the foundations of buildings; Roman intermingled with other bricks; a subterranean arched gateway, and steps leading down to it; urns with bones and ashes; wells; a quantity of oak timber mortised together like a floor, grown very hard and black, and of uncertain extent; Roman silver and brass coins, consular and imperial, and some silver coins with Saxon characters. At Ruckholts, or Rockholts, a manor in this parish, are some remains of antient entrenchments, a square double embankment, with an intervening ditch, enclosing a circular embankment, thirty-three yards in diameter, surrounded by a moat; both are much obscured by trees.

St. Osyth is in the hundred of Tendring, 62 miles from London and 11 from Colchester, on the marshy coast at the north-eastern side of the mouth of the Colne. A small creek, or arm of that river is navigable for small boats up to the quays in this parish. The population in 1831 was 1583, chiefly engaged in agriculture. The original name of the place was Chich, and it took its name of St. Osyth from a virgin said to be of royal blood, but whose history involves too glaring an anachronism to be worthy of credit, who founded here a nunnery, afterwards destroyed by the Danes. An abbey for the canons of St. Augustin was subsequently founded here in or before the year 1118, in honour of St. Peter, St. Paul, and the above-mentioned St. Osyth. The yearly value of the revenues of this abbey at the dissolution was 758*l.* 5*s.* 8*d.* gross, or 677*l.* 1*s.* 2*d.* clear. The quadrangle of the antient monastic buildings is almost entire, excepting on part of the north side, where it has been replaced by modern apartments; the entrance is by a beautiful gateway of hewn stone mixed with flint, having two towers and two posterns: the stables and offices on the east and west sides of the court bear marks of great antiquity, and among the ivy-grown ruins of the garden is a pier with a Latin inscription describing the antient magnificence of the place. There are a battery, or martello tower, on the coast in this parish, and a signal station. The church contains several monuments of the D'Arcy family.

Prittlewell is in Rochford hundred, 39 miles from London, on the northern shore of the æstuary of the Thames. Milton, now a hamlet of this parish, is said to have been antiently a distinct parish; part of it has been

swallowed up by the sea gaining on the land. Morant, writing near the middle of the last century, says, 'it had a church, or chapel of ease, the remains of which were visible not long ago at low-water mark.' The village consists of two streets, on the slope of a hill, forming a right angle with each other, and having the church at the vertex on the summit of the hill. The church has a nave and chancel, a side aisle running the whole length of the building, and of nearly equal breadth with the nave. There is a fine western tower (in the Perpendicular English style) embattled, with strong buttresses and rich pinnacles: from its height and lofty situation it is a good sea-mark. There was once a priory of Cluniac monks here, cell to an alien priory of the same order at Lewes, in Sussex, but afterwards made independent: its yearly revenue at the dissolution was 194*l.* 14*s.* 3*d.* gross, or 155*l.* 11*s.* 2*d.* clear.

Southend is a hamlet of Prittlewell. It is pleasantly situated on the side of a wooded hill, and is in some repute as a bathing-place. The terrace, in what is commonly called New Southend, or the upper town, is a handsome range of buildings. There are a good hotel, an assembly-room (beside one at the hotel), a theatre, and a library, the last somewhat in the Gothic style. There is an Independent meeting-house. The population of the whole parish of Prittlewell was, in 1831, 2266; nearly half agricultural.

Stansted Montfichet is 32½ miles from London, on the Newmarket road, partly in Clavering half hundred, and partly in Uttlesford hundred. It consists mainly of a long straggling street. The name, Stansted, is supposed to be corrupted from Stone Street, the name of a Roman way, on or near which it stood; the epithet Montfichet was the surname of William Gernon, to whose father the lordship had been given by the Conqueror, and who built a castle here; the artificial mound on which the keep was built yet remains. It may be doubted whether the place took its name from the builder of the castle, or *vice versâ*: population in 1831, 1560.

The Sokens, including Kirby le Soken, Thorpe le Soken, and Walton le Soken, are in Tendring hundred: these parishes are for ecclesiastical purposes consolidated, and form a benefice in the diocese of London (exempt from the archdeacon's jurisdiction), of the annual value of 513*l.*, with a glebe-house. The word Soken is derived from the Saxon Soc, or Soca, signifying a peculiar power to administer justice within itself, and likewise the circuit within which such power was exercised. These villages possess some peculiar immunities, to which they owe their designation. They comprehend the promontory of the Naze, which formerly extended much farther to the west, but has been contracted by the encroachment of the sea. Ruins of buildings have been discovered under the water, particularly on a shoal called the West Rocks, nearly five miles from the shore, which is left dry at great ebbs. The spot where the ruins are found is distinguished by the name of The Town. The wall thrown up to keep out the sea gave name to Walton parish. There is a church in each parish; that at Thorpe is the largest. There is also a Baptist meeting at Thorpe, and a customary market is held there on Wednesday evening. Walton having the recommendation of a firm and extensive beach, has been resorted to for bathing by invalids from the eastern parts of Essex. The population of the three parishes in 1831 was as follows:—Kirby 972, Thorpe 1173, Walton 469; total 2614.

Walthamstow, is in Becontree hundred, a little to the left of the Newmarket road, about 6 miles from London, between the marshes of the Lea and Epping Forest. It contains a number of good houses usually occupied by persons engaged in business in London; but Walthamstow is not so much resorted to by these as formerly; its population has therefore diminished. The population in 1831 was 4258; above a third were employed in agriculture. The church possesses no architectural beauty. There are copper and oil mills in the parish. Wanstead, in the same neighbourhood, is a village occupied, like Walthamstow, by persons doing business in London; it is much smaller however, containing in 1831 only 1403 inhabitants. Wanstead House, formerly the seat of Earl Tylney, was one of the finest residences in the county of Essex. It was pulled down a few years since, and the materials sold. The park is let out in portions for grazing of cattle. A tesselated pavement of considerable dimensions, and several other Roman antiquities, were dug up in the year 1735.

Wivenhoe is in Lexden hundred, 4 miles from Colchester and 55 from London. It is on the north-east bank of the river Colne, just at the junction of the Roman. The village is on the slope of a hill, and commands a pleasant prospect down the river. Wivenhoe has a commodious quay and a custom-house; it may be considered as the port of Colchester. The population of the parish in 1831 was 1714, of which about one fourth was agricultural. The living is a rectory, of the yearly value of 371*l.*, with a glebe-house.

Woodford is in Becontree hundred, 8 miles from London on the Newmarket road. It is a long straggling place with a number of good houses, inhabited by merchants and tradesmen from London. The population in 1831 was 2548, of which about one-fourth was agricultural; the number of inhabitants had materially diminished since the previous census. The church is a modern erection, but in the antient English style. A group of houses about a mile north from the main part of the village takes the name of Woodford Wells, from a mineral spring, now in little repute.

Writtle is a large village, in Chelmsford hundred, about 3 miles west from the town of Chelmsford. It was formerly a market-town, but dwindled as Chelmsford rose into importance. Morant was inclined to place the Cæsaromagus of the *Itineraries* here; but there is no proof of its having ever been a Roman station. King John is said to have had a palace here, and a square plot of ground, with a moat round it, in which the foundations of a building were dug up about the middle of the last century, is thought to have been the site of it. The church contains a number of monuments, some of them elaborate and elegant. There was, before the Reformation, a hermitage in this parish, attached to St. John's Abbey, Colchester. The population in 1831 was 2348, nearly two-thirds agricultural.

There are several large villages in Essex beside those already noticed. Four (Dagenham, Finchingfield, Hornchurch, and Great Waltham) had, in 1831, above 2000 inhabitants; five others had above 1500; and nineteen others had more than 1000.

Divisions for Ecclesiastical and Legal Purposes.—Essex constitutes the largest part of the diocese of London, which is in the ecclesiastical province of Canterbury; and is divided between the three archdeaconries of Colchester, Essex, and Middlesex. The office of rural dean has been disused for many years; the county is, however, still divided into deaneries, which are thus arranged.

The deaneries of Colchester, Lexden, Tendring, Newport, and Sandford constitute the archdeaconry of Colchester. The deaneries of Barstable, Barking, Chafford, Chelmsford, Dengie, Ongar, and Rochford constitute the archdeaconry of Essex. The deaneries of Dunmow, Harlow, and Hedingham constitute part of the archdeaconry of Middlesex, which extends beyond this county.

The number of benefices we cannot exactly give. The Population Returns for 1831 contain the names of 409 parishes and 4 district chapelries (Basildon, Brentwood, Canvey Island, and Epping), together 413 benefices; but of these three (Bures, Haverhill, and Keddington or Kitton) are mostly in Suffolk; and Ballingdon or Brundon (antiently Berington) is for ecclesiastical purposes united to the parish of All Saints, in Sudbury. The parishes of Bocking, Stisted, Latchingdon-with-Lawling, and Southchurch are in the peculiar jurisdiction of the archbishop of Canterbury. Of the above parishes, 16 are in the borough and liberties of Colchester, 2 in the borough of Harwich, and 3 in that of Maldon.

Morant, in his History of Essex, gives the following as the number of churches and chapels. In the archdeaconry of Colchester, 161; in that of Essex, 175; in that of Middlesex, 83; peculiars 4; total, 423: but this, no doubt, includes chapels of ease, or non-parochial chapels. In Gorton's Dictionary the number of parishes is given at 405, which agrees with the number in the Population Returns, deducting the three which are mostly in Suffolk, and that of Ballingdon, which is ecclesiastically united to a Suffolk parish. Lewis's Dictionary gives the number of parishes at 400, of which 250 are rectories, 134 vicarages, and the remainder perpetual curacies.

Dissenters are numerous in Essex, especially the Independents; nearly all the towns and many of the villages have congregations of this persuasion, and some of the congregations are very large. The Baptists have also many meeting-houses; the Wesleyans, we believe, not so many,

the Quakers have places of worship in several of the large towns.

Essex is in the home circuit. The assizes and quarter-sessions are held at Chelmsford, where is the shire-hall, an elegant structure, and the old county-gaol and house of correction. The new county-gaol is at Springfield, a village about a mile from Chelmsford, on the road to Colchester.

For the election of members of parliament the county was, by the Reform and Boundary Acts, divided into two parts, each returning two members. The northern division comprehends the hundreds or half hundreds of Clavering, Dunmow, Freshwell, Hinckford, Lexden, Tendring, Thurstable, Uttlesford, Winstree, and Witham. Braintree is the chief place of election, and the polling-stations are Braintree, Colchester, Saffron Walden, and Thorpe-le-Soken. The southern division comprehends the hundreds or half hundreds of Barstable, Becontree, Chafford, Chelmsford, Dengie, Harlow, Ongar, Rochford, Waltham, and the liberty of Havering. The chief place of election is Chelmsford, and the polling-places are Chelmsford, Billericay, Romford, Epping, Rochford, and Maldon. The boroughs of Colchester, Harwich, and Maldon continue to return two members each, as before the Reform Act. By the Boundary Act an addition (the parish of Heybridge) was added to Maldon. The boundaries of the other boroughs remain as before. None of the old parliamentary boroughs disfranchised or the new ones created by the Reform Act are in this county. The only change in the number of representatives made by that act was by the division of the county and the consequent addition of two representatives.

History and Antiquities.—In the earliest dawn of the authentic history of our island, Essex was inhabited by the Trinobantes (Τρινοαντες), a powerful tribe whose dominions perhaps extended across the Stort and the Lea into Hertfordshire and Middlesex. At the time of Julius Cæsar's invasion (B.C. 55 and 54), Imanuentius, as he is called in Latin, prince of the Trinobantes, had been slain by Cassivellaunus, the predominating chieftain of a neighbouring tribe, and his son, Mandubratius, had been driven into exile, and had gone as a suppliant to Cæsar in Gaul. Cæsar's success induced the Trinobantes to implore of him the restoration of their native prince: and Cæsar, acting upon the usual policy of the Romans, which was to secure allies in or near the countries which were the objects of their attack, complied with their request. Mandubratius was restored, and afterwards secured in the possession of his throne by an express stipulation in the treaty between Cæsar and his British opponents. The alliance of Rome seems to have promoted the aggrandizement of the Trinobantes: Cunobelin, king of that tribe, was a potentate of considerable name, and some coins of his yet extant attest the commencement of civilization and the arts in this county. [BRITANNIA.] Cataràtacus (Καμαράτακος, Dion.), or, as he is commonly called (after Tacitus), Caractacus and Togódumnus (Τογόδουμνος, Dion.), sons of Cunobelin, succeeded to their father's power, and had to bear up against the weight of Roman hostility when the invasion was renewed in the reign of Claudius (A.D. 43). After sustaining several severe defeats, the Britons retired into the marshes of Essex, and fighting with the vigour of despair, were enabled for a time to repel their assailants, though with the loss of Togódumnus, one of their leaders. But the arrival of the Emperor Claudius was the signal for the renewal of the attack. The Trinobantes were subdued, and their capital, Camulodunum (Καμουλοδουνον, Dion. Καμουδολανον, Ptol.), was taken, and subsequently made the seat of a Roman colony, which was however destroyed in the revolt of the Britons under Boadicea, and the Roman garrison slaughtered The defeat of the ninth legion, which was coming to the relief of the colony, under the command of Cerealis, who escaped with his cavalry to his camp and there stood a siege, added to the exultation of the Britons, who captured Londinium and Verulamium and massacred the inhabitants: but the bloody overthrow of Boadicea by Suetonius (A.D. 61) put an end to their revolts, and decided, though it did not complete, the reduction of South Britain. Several of these events occurred in this county. In the Roman division of Britain, Essex was included in Flavia Cæsariensis.

Mr. Lethieullier (Morant's *Essex*) places the final defeat of Boadicea 'somewhere between Epping and Waltham, near which a fine camp remains:' but others place it in the fields immediately north of London. [BRITANNIA.]

Several Roman stations were in Essex. Of these the most important is Camulodunum, upon the determination of the site of which depends that of the others. Three sites in this county have been proposed, Walden, Maldon, and Colchester. One antiquary (N. Salmon) places it at Castle Camps, in Cambridgeshire; other opinions, which place it in Yorkshire or in Scotland, may be dismissed at once. For Walden little seems to be urged but the pleasantness of the situation, an attribute which Tacitus ascribes to Camulodunum; for Maldon there appears to be little evidence, except the resemblance of the name and the opinion of Camden; while abundance of Roman antiquities, the pleasantness of its situation, the agreement of its distance from London with that given in the *Itinerary* of Antoninus, and the termination of its name—chester—a usual indication of a Roman station, agree in supporting the claim of Colchester. Perhaps the first part of its name also may be taken as evidence; for although the names of our waters are commonly of British origin, we may suppose that the Colne (whence Colchester) obtained its designation from the Roman *colonia*, which graced its banks.

The two Iters of the Antonine *Itinerary* which connect Camulodunum with Londinium are thus given:—

Iter IX. à Camuloduno.		Iter V. à Londinio.	
Canonio	M.P. IX.	Cæsaromago	M.P. XXVIII.
Cæsaromago	M.P. XII.	Colonia	M.P. XXIV.
Durolito	M.P. XVI.		
Londinio	M.P. XV.		
	M.P. LII.		M.P. LII.

It will be observed that although the distances between Cæsaromagus (the only intermediate station mentioned in both Iters) and Londinium and Camulodunum respectively do not agree, the total distance between the two extremes is the same in both, viz., Millia Passuum LII, about equal to 48 English miles, which is nearly the distance of Colchester from London in a straight line, and it is known that the Roman roads were commonly straight. The distances given in Iter IX, which we take to be the most correct, will agree tolerably well with the positions assigned to the other stations in the map of antient Britain, published by the Society for the Diffusion of Useful Knowledge, viz., Durolitum, near Romford; Cæsaromagus, near Widford, a village about a mile south-west of Chelmsford; and Canonium, near Kelvedon. If these positions are fixed with tolerable approximation to accuracy, the Roman road must nearly have coincided with the modern road from London to Colchester, which is probable.

It is supposed however to have crossed the Lea at Oldford, not Stratford; but this seems doubtful; possibly there were two branches of the road, one passing at each place. The positions assigned to these stations in Morant's *Essex* agree with those in the Society's map, except that Durolitum is placed below Brentwood, and Cæsaromagus at Chelmsford, or rather Writtle, which is a mile or two west of it, and not far from Widford. Another station of the Antonine *Itinerary*, Ad Ansam, was probably on the border of the county, perhaps at Stratford, just across the Stour, in Suffolk. It is given as distant from Camulodunum M.P. VI, which accords very well with Stratford.

A Roman road, the line of which is still visible in many places, crossed the county from Bishop Stortford, in Herts, by Dunmow, Rame Hall, Coggeshall, and other places, to Colchester. A record of the time of John describes this as 'calcea quæ tendit de Sterteford versus Colcestr.'

Roman antiquities have been dug up in many parts of the county, but especially at Colchester, where urns, pavements, and medals have been found in great abundance, and almost every antient building shows a greater or less proportion of Roman materials worked up in its walls. Round Colchester are the remains of intrenchments and other military works. Tesselated pavements and other antiquities have been discovered on Mersey Island, which Morant supposes to have been the residence of a Roman functionary, the 'Comes Littoris Saxonici,' or count of the Saxon shore. Roman remains have also been found at Wanstead; at Canewdon, not far from Rochford; at Coggeshall; at Toppesfield, not far from the Hedinghams; at Ridgwell, in the same part of the county, near which a

Roman road was formerly visible; at Watsoe bridge, between Birdbrook and Steeple Bumpstead parishes, near the Stour, where is a Roman camp; and at Great Chesterford (near Saffron Walden), which was undoubtedly the site of a Roman station. Antiquaries have sought to identify this station with the Camboricum or Iciani of Antoninus; but it is very difficult to reconcile its site with the distances of the Iter v. of Antoninus, in which it is mentioned.

Colchester appears to have been, in the latter period of the Roman dominion, the seat of a bishop's see. Adelfius, the bishop of Colon or Colchester, assisted at the councils of Arles, A.D. 314; Sardica, A.D. 347; and Ariminum, A.D 359.

When the Saxons established themselves in Britain, Essex, with some parts of Hertfordshire and Middlesex, constituted a small kingdom, the possessors of which were, from their relative situation, called the East Saxons; from them the county has derived its present designation. Middlesex also, it may be observed, owes its name to its situation between the East and West Saxons; although it never had the rank of an independent kingdom.

Essex, according to Morant, was part of the territory extorted from Vortigern or Gwrtheyrn (A.D. 477) by Hengist, a chieftain whose fame, like that of other heroes in semi-fabulous periods, seems to have been augmented by the achievements and acquisitions of others of inferior reputation. Mr. Turner (*Hist. of Anglo-Saxons*), with better judgment refers the foundation of the kingdom of Essex to a later period (A.D. 530), and to a leader, whose name he does not give, but who is elsewhere called Erchenwin. Morant supposes this Erchenwin to have revolted from under the weak government of Octa, king of Kent, without, so far as appears, any reason except that he had originally included Essex in the conquests of Hengist, and therefore in the kingdom of Kent. This kingdom of Essex gradually extended across the Lea into Middlesex and Hertfordshire, and comprehended London, then a flourishing trading place, and which appears to have become the capital of the East Saxon kingdom. The successor of Erchenwin was Sledda, and the successor of Sledda Saebyrht or Sabert. The latter was the nephew of Æthelbyrht or Ethelbert, king of Kent, the first of the Saxon princes that embraced Christianity, and was in subjection to his uncle, at that time the most powerful of the Anglo-Saxon kings. Saebyrht embraced Christianity; the episcopal church of St. Paul in London was founded by Æthelbyrht, and Mellitus, who had been sent from Rome to assist the missionary St. Augustin in evangelizing England, was appointed bishop of Essex, into which kingdom he had been sent as missionary by Augustin. Saebyrht himself founded the abbey and church of Thorney, afterwards called, from its situation with respect to St. Paul's, West Minster (A.D. 604-611). We notice these events because, though not immediately connected with the county of Essex, they are among the most important occurrences in the scanty annals of the East Saxon kingdom.

Upon the death of Saebyrht (A.D. 616), Saxred, Siward, and Sigebriht ascended the throne, and reigned conjointly: they restored Paganism and persecuted Christianity, and appear to have been killed together about A.D. 623. Sigebriht the Little reigned after them from A.D. 623 to 653; and after him reigned Sigebriht or Sigeberht the Good, who, being converted by his friend Oswy, king of Northumberland, whom he used frequently to visit, and baptized by Finan, bishop of Lindisfarne, restored Christianity in Essex, and sent for some Northumbrian monks to come and instruct his subjects. Cedd, one of these, was consecrated bishop of the East Saxons (A.D. 653). Sigebriht was assassinated two years afterwards (A.D. 655). The subsequent kings of Essex were as follows:—Swithelm, Sibbi, and Sighere; the latter died A.D. 683, and Sibbi turned monk A.D. 694: Sigehard and Senfrid: Offa, who went to Rome, and turned monk, A.D. 707: Suebricht, called Selred by some, but erroneously: Swithred was reigning A.D. 758. There were a few others, whose very names are unknown. The dates are from Morant chiefly, but in so uncertain and confused a period they cannot be relied on as very exact.

In A.D. 823, Egbert of Wessex, who had just gained over Beornwulf of Mercia that victory which established the permanent supremacy of Wessex over the other kingdoms of the Octarchy, despatched his son Ethelwulf and the war-like statesman Ealstan or Alstan, bishop of Sherbourne, into Kent and Essex; and these kingdoms, which had sunk into mere dependencies of Mercia, were subdued, and probably united under the designation of the kingdom of Kent, occupied by Ethelwulf as subordinate to his father, and of which mention is occasionally made in the history of Ethelwulf and his sons, until the reign of Alfred, by whom the Saxon kingdoms were finally incorporated; and England, with the exception of those parts which were occupied by the Danes or retained by the Britons, was consolidated under one sceptre.

When Alfred, after the recovery of his throne, assigned to the piratical Northmen, or Danes, a settlement in and about East Anglia (A.D. 878), Essex was included in the ceded territory. One or two of the naval conflicts between the ships of Alfred and those of the piratical Danes who continued to infest the coast, were fought off the Essex shore. Thirteen or sixteen sail of Danish vessels were destroyed in the mouth of the Stour, near Harwich (A.D. 884); but the victorious fleet was destroyed near the Thames mouth by some ships fitted out by the colonists of East Anglia in violation of their engagements with the king. On the death of Godrun (A.D. 890) Essex returned under the government of Alfred, who appointed Bertheolf earl of the county. When Hastings invaded England, A.D. 894, and the main part of his army had been defeated at Farnham, in Surrey (A.D. 894), part of the fugitives escaped over the Thames and marched across Middlesex and Essex pursued by Alfred, until they crossed the Colne and found refuge either in Mersey Island (Turner), or more probably in the peninsula of Brightlingsea (Breklesey, Speed, Morant), where some of their ships had come, and where the king had not any navy at the time to press the siege. Alfred in person, and afterwards when he was called away, his generals, maintained a close blockade on the land side, and at last the Danes sued for peace and agreed to retire from England; but instead of doing so, they hastened to join Hastings, who, with another part of his forces had, in the mean time, landed at South Bemfleet, or Benfleet, in Essex, on the æstuary of the Thames, and built a fort there. In the absence of Hastings, the Londoners and the troops who had blockaded Mersey, stormed his fort, took his wife and two of his children prisoners, recovered a quantity of plunder, and broke up and burned many of his ships, or carried them away to London and Rochester. The wife and children of Hastings were loaded with presents by Alfred and sent back to the piratic chief; but his hostility was not thereby softened. He erected another fortress (of which large traces appear still to remain) at South Shoebury, in Essex, a few miles from his former one. With his main army he crossed the island to the Severn; but was compelled to return with baffled and weakened forces. Before the winter came on he assembled another army, and marched to Chester and into North Wales; but being every where watched by the vigilance of Alfred, he marched back through Northumberland and Mercia to Mersey Island, in Essex, the coast of which he always chose for his strongholds, and in which he seems to have wished to establish a kingdom. Ultimately the Danish chief was compelled to abandon England after three years of incessant hostility (A.D. 894—896), and Essex returned peaceably under the West Saxon sway.

After the death of Alfred (A.D. 901), and the choice of Edward the Elder as his successor, Æthelwald, or Ethelwold, son of Ethelbriht or Ethelbert, Alfred's elder brother, claimed the throne, and having taken to a piratical life, and obtained foreign aid, returned and subdued Essex. The subsequent death of the invader in battle (A.D. 905) put an end to the strife, and restored Essex to the sway of Edward, who subsequently rebuilt or fortified Witham (A.D. 913), in order to bridle the rebellious temper of the Danish colonists; and some years after (A.D. 920) fortified Maldon. In A.D. 921 he took by storm Colchester, which the Danes, with whom he was now at war, had held, and strengthened the place by repairing the fortifications; he also defeated an attack of the Danes upon Maldon.

In A.D. 991, in the reign of Ethelred II., Essex was again the object of Danish attack. A large force landed and attacked Ipswich, in Suffolk, and marching from thence to Maldon, defeated and slew the governor, or earl of the county, who had collected some forces to oppose them they were bought off by the payment of a large sum. In

A.D. 994 the coast of this county was ravaged by them; they were again bought off. Essex was one of the counties ceded by Ethelred to Svein, king of Denmark, by treaty A.D. 1010 or 1011.

In A.D. 1016 Essex was the scene of a fierce battle between Canute and Edmund Ironside, who had succeeded to the thrones and the hostility of their respective fathers, Svein and Ethelred. Canute, by the treachery of Edric (brother-in-law and foster-father to Edmund), obtained the victory. The battle was fought at Assandun, which some suppose to be Ashdon, in the north-western part of the county, near Saffron Walden; others, with more probability, fix the scene of conflict at Assingdon, or Ashingdon, in the hundred of Rochford. At Canewdon (the name of which is probably derived from that of the victor), a parish which adjoins Assingdon on the east, are the remains of a camp, supposed to have been that of the Danes; its form is oblong, and it comprehends an area of about six acres: the vallum has been levelled, but the fosse is yet visible. (*Beauties of England and Wales.*)

The history of the county is not marked by any particular event until the civil war between king John and his barons. In A.D. 1215 the earl of Winchester, one of the confederated lords, with an army of foreigners whom he had brought into the country, besieged Colchester castle, but withdrew upon hearing that relief was coming from London. However, he or some of his party soon afterwards took it and plundered the town. The king however retook it after a few days' siege. During the minority of Henry III. Colchester fell into the hands of the Dauphin Louis (A.D. 1218), who had been invited over by the discontented nobles. At the siege of Calais by Edward III. Colchester furnished five ships and 170 mariners.

In the reign of Richard II. occurred the arrest of Thomas of Woodstock, duke of Gloucester, the king's uncle, who was at the time residing at his castle of Pleshy in Essex, about 6 miles north-west of Chelmsford. There the king visited him, and at the close of his visit invited him to return to town. At Stratford the king had placed in ambush the earl marshal and his followers, who arrested the duke on a charge of high treason. he was subsequently smothered at Calais, and his body being brought to England was buried in the church of Pleshy, which he had himself founded.

Of the troubled period to which the above incidents may be referred Essex contains several memorials in the encampments. castles, and other ruins which are found in it. Various camps may yet be traced referrible to the British, Roman or Saxon periods, as that which incloses the village of Danbury (Danes-byrig), on a high hill between Chelmsford and Maldon; those at Maldon (probably the work of Edward the Elder), at Witham, at Ambresbury banks, near Epping, at Ruckholt, near Barking, at South Weald, near Brentwood, at Canewdon, and at Blunt's walls near Billericay. Many of these have been already mentioned. Of the castles of the Norman period there are also several remains. Those at Colchester, Hedingham, Walden, Ongar, and Raleigh, have been noticed in this article or under their respective heads. Pleshy was the site of a Roman camp or station, and some Roman antiquities have been found at it. The castle was probably built by William de Magnaville, to whose father, Geoffrey de Magnaville, the place had been granted by the usurper Stephen. The keep with the moat which surrounded it were within the Roman intrenchment: the mound on which the donjon was built, and the bridge which led to it over the surrounding moat, are all that remain of the once proud structure. Of Hadleigh Castle, near Raleigh, dilapidated portions of two towers yet remain, forming picturesque masses of ruin. At Clavering in the north-west part of the county are the mound on which the keep stood and the moat of a castle, long since destroyed.

Of the halls and manor-houses which succeeded the Norman castles and gave indication of a quieter period, though showing by their massive strength that the nation had not quite settled into peaceful security, may be mentioned Heron Hall, near East Horndon, Nether Hall, near the confluence of the Lea and the Stort, Tolleshunt Beckingham or Tolleshunt Magna, between Maldon and Colchester, Layer Marney Hall, in the same neighbourhood, Belhus or Bellas House, near Purfleet, Covet or Covell Hall, near White Roding, Eastbury, near Barking, Danbury Place, between Chelmsford and Maldon, New Hall, near Chelmsford, and Toppinghoe Hall, between Chelmsford and Witham. Of Heron Hall two picturesque round towers remain; and of Nether Hall, a vast gateway with two half hexagon towers, one on each side, so massive as to prevent their destruction when the rest of the mansion was pulled down, about A.D. 1773. Of Tolleshunt manor-house there remains an antient brick gateway, with four embattled turrets. Of Layer Marney Hall, the gateway and part of the south side are yet standing, and are converted into a farm-house and offices: it was originally a large quadrangular building, inclosing a spacious court, to which the existing gateway was the principal entrance. Of Covet Hall there remains a gateway of brick, much ornamented. The other houses are, we believe, entire, except New Hall, of which however a large portion remains, formerly occupied by some English nuns from Liege, who took refuge in England from the French Republican armies. Other antient houses have been already noticed in the course of this article, and we have only further to mention Gosfield Hall, near Halsted, which belongs to the duke of Buckingham, and is probably of the time of Henry VII. This mansion is of brick, and incloses a quadrangular court, into which all the lower tier of windows formerly opened. There were no outside windows on the ground-floor, and those of the upper story were strongly barricaded, so as to give to the place considerable strength. The house as originally built consisted of only one room in thickness, and there was no communication round the inside but by passing through every room; but various improvements and additions have been made in modern times. There are a few good pictures, the rest have been removed to Stow, another mansion of the duke. The park is extensive.

At the Reformation Essex possessed several religious houses, of which there are some remains. There were at the time of the Suppression seven of the greater monasteries, that is, of those which according to the valuation of their lands and endowments possessed a clear yearly revenue of above 200*l.*; they were as follows:—

Place.	Description.	Yearly revenue.							
Berking (Barking)	Abbey for Benedictine nuns .	£1084	6	2	gross	£862	12	5	clear
Chich (or St. Osyth)	Abbey for Augustin canons .	758	5	8	„	677	1	2	„
Coggeshall . .	Abbey for Cistertian monks .	298	8	0	„	251	2	0	„
Colchester . .	Benedictine Abbey	..			„	523	17	0	„
Stratford Langthorne	Abbey for Cistertian monks .	573	15	6	„	511	16	3	„
Walden . .	Abbey for Benedictine monks	406	15	11	„	372	18	1	„
Waltham . .	Abbey for Augustin canons .	1079	12	1	„	900	4	3	„

For any further particulars of these see above, or in the articles BARKING and COLCHESTER.

Of the smaller religious houses, the following remains may be noticed in addition to such as have been already mentioned.

The remains of Bileigh or Beleigh Abbey, near Maldon, have been converted into a farm-house and offices; the chapel, the most perfect portion, having been used as a hog-sty. It is small, 36 feet long by 18 broad, formed of a fine-grained limestone, and has groined arches, supported by three slender Purbeck columns. These ruins are chiefly in the Perpendicular style, with some portions of earlier date.

Of Tiltey priory, between Dunmow and Thaxted, the east end of the church remains, and is now used as the parish church: there are also a few of the cloisters yet standing. The church is a remarkably fine specimen of decorated work, with bold buttresses at the eastern angles, and two rich niches for statues. The east window is very fine, ornamented with tracery, and in the interior of the church are some rich stalls.

Of Bycknacre Priory, between Chelmsford and Maldon, the central arches of the church and a small portion of the antient wall remain. They are of very late Norman or Early English character. Of Latton Priory, near Harlow, there are some remains used as a barn; they show that the building contained some good Decorated work. Of Lees Priory, between Chelmsford and Braintree, there is a gate-house, with an embattled octangular tower at each corner, of Perpendicular character. Of Thoby Priory, between Brentwood and Ingatestone, there are some slight remains. The churches of Blakemore or Blackmore Priory, between

Ingatestone and Ongar, and of Hatfield Peverel Priory, between Chelmsford and Witham, have been made parochial: the latter has been much altered; it retains a good Norman door, with zigzag mouldings.

Of the early churches, beside those which we have already had occasion to mention, the following deserve notice:—Greenstead church, near Ongar, is a very curious edifice, and one of the most antient in the kingdom: it seems probable that it was built as a sort of shrine for lodging the body of St. Edmund, king of East Anglia, on its being taken back from London to Bury St. Edmund's, in the early part of the eleventh century; and that it was afterwards enlarged to serve as a parish church. The nave is entirely composed of wood, the sides being formed of the trunks of large chestnut-trees (or oaks) split or sawn asunder, and set upright close to one another. They are let into a wooden sill at bottom, and into a plate at top, and secured with wooden pins: two vacancies are filled up with plaster. There is a boarded tower at the west end, but this does not appear to be so antient as the nave: also a wooden porch on the south side of the nave. The chancel is partly of brick, and the nave is strengthened by brick buttresses. The entire length of the original or wooden part of the church is 29 feet long by 14 broad, and 5½ high to the spring of the roof, which is tiled, and not so antient as the sides. 'Little Maplestead church (near Halsted) is a building of great interest, being the latest of the few round churches in the kingdom; it is of pure Decorated character, and its details plain, but very good.' The chancel end of this church is also semicircular, and is probably the latest erection of that form in England. The diameter of the circular part is about 26 feet (or 30 feet according to others); it has a peristyle of six clustered columns, supporting pointed arches: the whole length of church and chancel is about 60 feet. South Ockendon church, near the Thurrocks, has a round tower, such as may be commonly seen in Norfolk, but not much elsewhere: it has an elaborately and variously enriched Norman door: Corringham and some other churches have Norman portions.

When the Catholic religion regained a temporary predominance over the Reformation under Mary I., the persecution was very severe in Essex. Seventeen persons (five of them women) were burnt at Colchester, and one died in prison; and two persons (one a woman) were burnt at Stratford.

The year 1571 was remarkable for the settlement of the Flemish refugees at Colchester; they introduced the woollen manufacture into that and several other towns in Essex.

When the Spaniards were expected to attack England with their Invincible Armada (A.D. 1588), a camp was formed at Tilbury, where a body of more than 18,000 men, under the earl of Leicester, was posted. Tilbury Fort was then a block-house, which had been built by Henry VIII. to defend the passage of the river; it was at a subsequent period (upon the alarm caused by the Dutch sailing up the Medway, A.D. 1667, and burning the ships at Chatham), enlarged and made a regular fortification, as it is at present. The camp at Tilbury was visited by Elizabeth, whose presence increased the general enthusiasm. Colchester on this occasion furnished two ships and a pinnace to the English fleet. In 1595 the same town furnished three ships for the expedition to Cadiz.

In the war with Spain at the beginning of the reign of Charles I., a Spanish fleet caused alarm by appearing off Harwich; but they made no attempt to land (A.D. 1625). In the civil war at the close of the same reign, Essex was almost entirely in the interest of the parliament, and joined in an association for mutual aid and succour with the other eastern counties of Norfolk, Suffolk, Cambridge, and Herts: this was called the Eastern Association. The towns of Essex and Suffolk, upon a requisition from the committee of both houses, raised 2000 men for the service of the parliament, besides large supplies both of men and money which they sent to the parliament at other times. The county appears to have been exempt from the immediate sufferings of the civil war during the continuance of the main contest; but in the year 1648 it was the scene of one of those isolated and abortive attempts of the royalists, the narratives of which form so many episodes in the great history of the war. A part of the royalist forces, which had been raised in Kent under Goring, earl of Norwich, and Sir William Waller, and were pressed by Fairfax and the parliamentary army, crossed the Thames into Middlesex, and retreating thence into Essex, were joined by the royalists of that county (who had previously seized the parliamentary committee at Chelmsford) and by some royalist gentlemen from Hertfordshire. Their leaders were the earl of Norwich, Lords Loughborough and Capel, Sir Charles Lucas, Sir George Lisle, Sir Bernard Gascoigne, Sir William Campian, Sir William Compton, Sir William Leyton, Sir Richard Hastings, and many other officers and gentlemen. They retired first to Chelmsford, from thence to Braintree, taking in their way Lees House, the seat of the earl of Warwick, and from thence to Colchester, which they entered by convention, after a slight skirmish with the townsmen. To this place Fairfax with his army advanced in pursuit of them, and made a desperate attempt to storm the town. The royalists repulsed him, but with the loss of one of their men of note, Sir William Campian, and nearly 200 men killed and wounded. The Parliamentarians' loss was probably nearly 1000 killed, wounded, and taken. Fairfax now laid close siege to the town, which was blocked up on every side; and two small frigates of ten and eleven guns, which lay in the river to assist the king's party, were taken by some parliamentary vessels from Harwich. After a siege of between two and three months and several severe actions, the royalists were forced to surrender at discretion. The parliamentary general, deeming it necessary to make an example of the leaders of this rising, and being sanctioned by the determination of a council of war, ordered Sir Charles Lucas, Sir George Lisle, Sir Bernard Gascoigne, and Colonel Farre to be executed the day the town was given up. Farre had escaped; Gascoigne, who was a Florentine, was reprieved; but the other two were shot under the walls of Colchester Castle.

In A.D. 1665 and 1666 Colchester suffered severely from the plague. In the abovenamed years 4731 persons died of it: nearly 200 of them in one week. In A.D. 1684 the charter of Colchester was surrendered to the crown, and a new charter granted the same year, which was remodelled by James II. A.D. 1688; but after the Revolution the original charter was restored.

The history of the county presents no later events of any interest.

(Morant's *History of Essex*; *Beauties of England and Wales*; *Ordnance Survey of Essex*; Conybeare and Phillips's *Outlines of the Geology of England and Wales*; Young's *Agriculture of Essex*; Rickman's *Gothic Architecture*; Turner's *Anglo-Saxons*; *Excursions in Essex*; *Parliamentary Papers, &c.*)

Statistics.

Population.—Essex is an agricultural county, and but few of its inhabitants are engaged in manufactures. Of 79,023 males twenty years of age and upwards, living in the county in 1831, 43,683 were engaged in agricultural pursuits, and only 871 in manufactures or in making manufacturing machinery. Of these latter 500 were employed in the manufacture of silk goods, principally at Braintree, Great and Little Coggeshall, and Bocking; at Halsted there were 59 silk-machine makers; about 30 men were engaged in the manufacture of gunpowder at the government establishment at Waltham Abbey. At West Ham, in the vicinity of the metropolis, operative chemistry gives employment to several of the inhabitants. Essex ranks the eighth on the list of agricultural counties, and in this respect retains the same position as in 1811.

The population of this county at each of the four periods in which the census was taken during the present century was:—

	Males.	Females.	Total.	Incr. per cent
1801	111,356	115,081	226,437	
1811	124,839	127,634	252,473	11.49
1821	144,909	144,515	289,424	14.63
1831	159,015	158,492	317,507	9.50

Showing an increase between the first and last periods of 91,070, or a little more than 40 per cent., which is 17 per cent. below the whole rate of increase throughout England.

The following table is a summary of the population, &c., of every hundred as taken in 1831:—

HUNDREDS, &c.	HOUSES. Inhabited.	Families.	Building.	Uninhabited.	OCCUPATIONS. Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	PERSONS. Males.	Females.	Total.	Males twenty years of age.
Barstable	2,247	2,614	4	59	1,815	502	297	7,019	6,162	13,181	3,521
Becontree	6,118	7,197	51	358	2,312	2,239	2,646	16,609	18,315	34,924	8,020
Chafford	1,784	1,992	13	40	989	603	400	5,092	4,896	9,988	2,726
Chelmsford	4,916	5,648	32	138	2,892	1,838	918	13,900	13,279	27,179	7,156
Clavering	809	870	8	17	612	149	109	2,044	2,018	4,062	1 013
Dengie	1,609	1,949	6	36	1,345	404	200	5,184	4,731	9,915	2,608
Dunmow	2,367	2,663	7	36	1,781	521	361	6,538	6,253	12,791	3,307
Freshwell	1,332	1,488	19	21	1,079	266	143	3,445	3,362	6,807	1,761
Harlow	1,365	1,682	1	26	1,052	333	297	3,933	3,863	7,796	1,974
Havering-atte-Bower (Liberty)	1,217	1,383	5	63	594	484	305	3,381	3,431	6,812	1,805
Hinckford	7,887	8,500	41	224	5,032	2,301	1,167	19,896	20,287	40,183	9,647
Lexden	3,550	4,375	21	72	2,631	1,054	690	10,852	10,658	21,510	5,393
Ongar	2,414	2,795	7	79	1,787	615	393	7,572	7,143	14,715	3,714
Rochford	2,274	2,617	13	87	1,582	621	414	7,120	6,484	13,604	3,616
Tendring	3,955	4,726	15	92	2,901	1,092	733	11,479	11,307	22,786	5,668
Thurstable	1,166	1,212	3	41	749	290	173	3,051	2,891	5,942	1,463
Uttlesford	2,210	2,647	5	35	1,870	467	310	6,417	6,078	12,495	3,088
Waltham	1,581	1,666	11	108	732	559	375	4,172	4,179	8,351	2,154
Winstree	735	907	.	5	655	185	67	2,271	2,140	4,411	1,165
Witham	2,128	2,346	20	60	1,221	625	500	5,494	5,504	10,998	2,742
Colchester (borough & liberty)	3,216	3,488	25	119	490	2,079	919	7,471	8,696	16,167	3,745
Harwich (borough) . .	660	830	5	78	75	215	540	1,899	2,398	4,297	791
Maldon (borough) . .	671	724	9	48	122	306	296	1,859	1,972	3,831	830
Saffron-Walden (town) . .	941	1,000	33	18	271	534	195	2,317	2,445	4,762	1,116
Totals	57,152	65,319	354	1,860	34,589	18,282	12,448	159,015	158,492	317,507	79,023

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of

	£.		£	s.	d.	
1801 were	137,110,	being		12	1	for each inhabitant.
1811 ,,	312,230	,,	1	4	8	,,
1821 ,,	254,837	,,		17	7	,,
1831 ,,	272,593	,,		17	2	,,

The sum expended for the same purpose in the year ending March, 1836, was 185,394*l.* 17*s.*; and assuming that the population had increased at the same rate of per centage since 1831 as in the ten preceding years, the above sum gives an average of 11*s.* for each inhabitant. These averages are above those for the whole of England and Wales.

The sum raised in Essex for poor-rate, county-rate, and other local purposes, in the year ending the 25th of March, 1833, was 311,961*l.* 18*s.*, and was levied upon the various descriptions of property as follows:—

	£.	s.
On land . . .	251,571	18
Dwelling-houses . .	52,157	2
Mills, factories, &c. .	6,859	2
Manorial profits, navigation, &c.	1,373	16

The amount expended was:—

	£.	s.
For the relief of the poor . .	265,629	6
In suits of law, removal of paupers, &c.	8,190	5
For other purposes . . .	39,928	3
	313,747	14

In the returns made up for subsequent years, the descriptions of property assessed are not specified. In the years 1834, 1835, and 1836 there were raised 291,010*l.* 2*s.*, 260,424*l.* 5*s.*, and 228,811*l.* 19*s.*, respectively, and the expenditure of each year was as follows:—

	1834.		1835.		1836.	
For the relief of the poor .	£239,946	7	£210,045	16	£185,394	17
In suits of law, removals, &c.	6,898	3	7,318	18	5,444	9
Payment towards the county-rate . . .	39,484	9	18,253	14	17,470	10
For all other purposes			23,716	5	20,700	7
Total money expended	£286,3:8	19	259,334	8	229 010	3

The saving effected in the whole sum expended in 1836, as compared with that expended in 1834, was therefore about 20 per cent.; and the saving effected on the sum expended for the relief of the poor was not quite 23 per cent. in 1836, as compared with the expenditure in 1834.

The number of turnpike trusts in Essex, as ascertained in 1834, is 11; the number of miles of road under their charge is 249; the annual income in 1834, arising from the tolls and parish composition, was 34,501*l.* 15*l.* 1*d.*, and the annual expenditure 39,557*l.* 12*s.* :*d.*

The county expenditure in 1834, exclusive of that for the relief of the poor, was 18,847*l.* 10*s.* 6*d.*, disbursed as follows:—

	£.	s.	d.
Bridges, buildings, and repairs, &c. .	728	2	0
Gaols, houses of correction, &c., and maintaining prisoners, &c. .	10,311	17	2
Shire halls and courts of justice—building, repairing, &c. .	245	9	8
Prosecutions	2,382	13	8
Clerk of the peace . . .	1,385	7	4
Conveyance of prisoners before trial .	758	5	1
,, of transports . .	297	7	0
Vagrants—apprehending and conveying	315	18	0
Constables—high and special . .	552	5	2
Coroner	345	17	6
Miscellaneous . . .	1,524	7	11
Total . . .	18,847	10	6

The number of persons charged with criminal offences, in the three septennial periods ending with 1820, 1827, and 1834, were 1908, 2686, and 3837 respectively; making an average of 273 annually in the first period, of 384 in the second period, and of 578 in the third period. The number of persons tried at quarter-sessions, in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county-rates, were 386, 351, and 398 respectively. Among the persons charged with offences, there were committed for—

	1831.	1832.	1833.
Felonies . . .	293	319	321
Misdemeanors . .	93	32	77

The total number of committals in each of the same years was 407, 445, and 460 respectively.

	1831.	1832.	1833.
The number convicted was .	323	315	337
,, acquitted .	52	59	72
Discharged by proclamation	32	71	51

In 1836 at the assizes and sessions 619 persons were charged with crimes in Essex. Of these 49 were charged with offences against the person, 31 of which were for common assaults; there were 74 offences against property, committed with violence; and 442 committed without violence; 1 for sending threatening letters; 8 for forging and uttering false money; 1 for killing cattle; 2 for deer stealing; and 42 for riot. Of the whole number of offenders, 446 were convicted, 123 were acquitted, and against 51 no bill was found, or no prosecution ensued. Of those convicted, 20 were condemned to death, none of whom were executed, 17 had their sentence commuted for transportation, and three for imprisonment; 133 were sentenced to transportation for various periods; 279 to imprisonment, 235 of whom for only six months or under; 2 were whipped; 5 were fined, and 6 discharged on sureties. Of the number of offenders, 547 were males and 72 females; 293 could neither read nor write: 283 could read and write imperfectly; 31 could read and write well, and only 1 had received superior instruction; the state of instruction of the remaining 11 could not be ascertained.

The number of persons qualified to vote for the county members of Essex is 11,119, being 1 in 29 of the whole population, and 1 in 7 of the male population, twenty years of age and upwards, as taken in 1831. The expenses of the last election of county members to parliament were to the inhabitants of the county 159*l.* 5*s.* 9*d.*, and were paid out of the general county-rate.

There are fifteen savings' banks in Essex. The number of depositors and amount of deposits on the 20th of November were:—

	1832.	1833.	1834.	1835.	1836.
Number of depositors	8086	8535	9051	9390	9827
Amount of deposits	£268,333	277,754	289,767	302,061	312,386

The various sums placed in the savings' banks in 1835 and 1836 were distributed as under:—

	1835. Depositors.	1835. Deposits.	1836. Depositors.	1836. Deposits.
Not exceeding £20	5734	£37,301	5388	£38,307
„ 50	2375	73,299	2495	76,480
„ 100	1150	78,931	1204	83,189
„ 150	416	50,139	406	49,270
„ 200	221	37,734	243	41,534
Above 200	94	24,657	91	23,606
	9390	302,061	9827	312,386

Education.—The following summary is taken from the parliamentary returns on education, made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools	88		
Number of infants at such schools; ages from 2 to 7 years:—			
Males		684	
Females		756	
Sex not specified		932	
			2,372
Daily schools	1075		
Number of children at such schools; ages from 4 to 14 years:—			
Males		13,559	
Females		12,993	
Sex not specified		4,053	
			30,605
Schools	1163		
Total of children under daily instruction			32,977
Sunday schools	438		
Number of children at such schools; ages from 4 to 15 and 16 years:—			
Males		12,594	
Females		13,354	
Sex not specified		3,712	
			29,660

If we assume that the population between the ages of 2 and 15 has increased in the same proportion as the whole population since 1821; and that the whole population has increased in the same ratio since 1831 as during the ten years preceding that period, we find that the number of children between the ages of 2 and 15 residing in Essex in 1834 was 109,011

Thirty-seven Sunday-schools are returned from places where no other schools exist, and the children (1513 in number) who are instructed therein cannot be supposed to attend any other school; at all other places Sunday-school children have opportunity of resorting to other schools also, but in what number or in what proportion duplicate entry of the same children is thus produced must remain uncertain. Seventy-seven schools, containing 5250 children, which are both daily and Sunday-schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. At a few of the Sunday-schools some scholars are 16 and 17 years of age. Making allowance for these two causes therefore, it appears that perhaps not more than one-half of the children between the ages of 2 and 15 are receiving instruction in this county.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars		Subscrip. and payment from scholars.	
	Schls.	Scholars	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars
Infant Schools	..	..	5	252	63	1,030	18	1090
Daily Schools	97	3476	112	5 690	767	15,673	99	5766
Sunday Schools	22	1359	383	25,293	..	..	33	3008
Total....	119	4835	500	31,235	832	16,703	150	9864

The schools established by Dissenters included in the above statement are:—

	Schools.	Scholars.
Infant schools	..	..
Daily	31	1235
Sunday	91	7600—8835

The schools established since 1818 are:—

		Scholars.
Infant and other daily schools	647, containing	18,533
Sunday-schools	230, containing	18,581

One hundred and one boarding-schools are included in the number of daily schools given above. No school in the county appears to be confined to the children of parents of the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists, together with schools for children of Roman Catholic parents.

Lending libraries of books are attached to forty-five schools in this county.

ESSEX, EARLS OF. Walter Devereux, first earl of Essex, the son of Sir Richard Devereux and Dorothy, daughter of George, earl of Huntingdon, was born in Caermarthenshire, at the castle of his grandfather, Walter Viscount Hereford, about the year 1540. He succeeded to the titles of Viscount Hereford and Lord Ferrers of Chartley in his nineteenth year, and was early married to Lettice, daughter of Sir Francis Knolles. When the rebellion, headed by the earls of Northumberland and Westmorland, broke out in 1569, he raised a considerable body of troops, and, in conjunction with other forces, compelled the rebels to retreat into Scotland. The courage that he displayed during this warfare recommended him to Queen Elizabeth, who had ever esteemed his loyalty and superior intelligence: in gratitude for the service that he had rendered her, she conferred on him the order of the Garter, and created him earl of Essex (1572). He now became so great a favourite with the queen, that Leicester and others about the court, jealous of his increasing influence, encouraged Essex to enter upon a scheme for subduing and colonizing a district of the province of Ulster. He had for some time contemplated such an expedition, and having been persuaded to take the command, embarked from Liverpool in August, 1573, in company with Lord Darcy, Lord Rich, and other persons of distinction. He contracted to furnish one half of the expense of the undertaking, in consideration of which he was to have one half of the colony as soon as it was established. His arms at the outset met with various success; but after a time his English friends deserted him, and their loss, together with the enmity of many courtiers at home, soon multiplied difficulties round him. He was obliged to resume the government of Ulster, which he had previously resigned; and he was compelled to make peace with O'Neil when his pursuit of the rebels under that leader gave every prospect of success. He was required to give up his command when he had nearly dispossessed the Scots, who had invaded the western islands in his territory, and with no higher title than that of captain was made to serve at the

head of a small body of 300 men. Feeling himself harassed and oppressed, he returned to England; but having received, with the title of Earl Marshal of Ireland, promises that he should have greater liberty of action allowed him if he would go back to that country, he consented to return to his post. The improvement of his situation, however, was so small that his spirits were affected; the effects of grief were soon visible in his constitution; a dysentery attacked him, and, after a month's pain and misery, he died at Dublin, on the 22nd of September, 1576: his body was removed for interment to the parish church at Caermarthen. The sudden failure of his health gave rise to a suspicion of his having been poisoned; but no evidence whatever could be adduced to prove the fact. The speedy marriage of the Countess of Essex to Leicester, who was charged with the murder of her late husband, did not tend to throw discredit on the report. Essex left two sons and two daughters. Of the sons we subjoin a further account. Of the daughters, Penelope first married Robert Lord Rich, afterwards Charles Blount, earl of Devonshire; and Dorothy first Sir Thomas Perrot, and afterwards Henry Percy, earl of Northumberland. (*Biog. Britan.; Criminal Trials*, vol. i.)

ROBERT DEVEREUX, earl of Essex, the son of the preceding Walter Devereux and Lettice Knolles, was born at Netherwood, in Herefordshire, in November, 1567, and was educated, according to his father's wish, under the superintendence of Lord Burleigh, by whose direction he was sent to Trinity College, Cambridge, in 1577, and remained there four years. Upon leaving the university, he retired for some time to his estate in South Wales, and did not appear at court till 1584. His station, his agreeable manners, handsome person, and vigorous mind soon brought him into notice. He was reconciled to Leicester, now his father-in-law, who had been suspected of causing his father's death; and received the appointment of Master of the Horse from the hands of the queen, who also made him a Knight of the Garter. Elizabeth at the same time remitted the debt to the exchequer incurred by his father; and when Leicester went with an army into the Netherlands in 1587, she gave to Essex, who accompanied him, the responsible commission of a captain-general of the cavalry. On the death of Leicester in 1588, Essex became her chief favourite. In 1589 he suddenly joined the expedition of Drake and Norris, who had undertaken to restore Antonio to the throne of Portugal. The queen, exasperated at his departure from court without giving her notice, despatched the earl of Huntingdon to Plymouth with a peremptory order for his return. The messenger was too late; Essex had sailed. He joined the expedition on the coast of Portugal, marched to Lisbon as a volunteer, behaved himself thoughout the enterprise with great gallantry and humanity, and on his return to England found that, in spite of his disobedience, he retained beyond all comparison the first place in the queen's favour. His chief rivals in her esteem were Sir Walter Raleigh, whose removal from court by the means of an appointment in Ireland has been attributed to the contrivance of Essex, and Sir Charles Blount, of whom he was so jealous, that upon the queen's bestowing a trifling mark of favour upon him at a tilting match, Essex used such insulting expressions to him that a duel ensued, in which the earl was wounded in the knee. In 1591 (a year after he had married a daughter of Sir Francis Walsingham, the widow of Sir Philip Sidney, whom the queen angrily declared to be in all respects unworthy of him), Essex was despatched to assist Henry the Fourth of France in his resistance of the king of Spain, who sought to obtain possession of the duchy of Brittany. He encamped under Rouen, and here, as at Lisbon, idly challenged the governor to a duel. The expedition was wholly unsuccessful, and the earl lost, by a musket-shot, his only brother Walter Devereux, to whom he was greatly attached.

In 1594, Essex, who had once before come into collision with the Cecils respecting the appointment of the queen's secretary, became a second time at variance with them. Having, as he conceived, discovered a plot in which Lopez and others had resolved to murder the queen, he apprised her majesty of his suspicions; but Lord Burleigh and Sir Robert Cecil, who, at the queen's desire, had examined into the case, declared the accusation to be unfounded, so that the queen severely rebuked Essex. Mortified both at this rebuke and at the conduct of his rivals, he renewed the inquiry, and eventually elicited evidence upon which Lopez and his confederates were executed. The opposition of the Cecils to the counsels of the earl of Essex was renewed in 1596. Lord Howard, then lord admiral, advised the queen again to invade Spain, a proposal which Essex warmly seconded; Burleigh, on the contrary, denounced the scheme as impolitic and imprudent. The queen gave her consent to the expedition: Howard and Essex sailed; Cadiz was taken, plundered, and burned; fifty-seven Spanish ships of war and merchantmen were taken or destroyed; and the Spanish government suffered considerable loss. But though the enterprise was successful, and commanded with the greatest gallantry, the benefits resulting to the English government were hardly equivalent to the expense incurred. After some trifling attacks upon the coast of Spain, the fleet, which had been absent little more than two months, returned to England. The enemies of Essex had endeavoured, during his absence, to poison the mind of the queen to his prejudice, but his publication of the 'Censure of the Omissions in the Expedition to Cadiz' completely reinstated him in her favour. He continued to meet with disappointments in his endeavour to obtain official situations for his friends, but was himself created Master of the Ordnance. In July, 1597, Essex, as commander-in-chief, with Lord Thomas Howard as vice-admiral, and Sir Walter Raleigh as rear-admiral, sailed against the Spanish fleet, with a view also of making conquests among the Azores. The English ships, shattered and crippled by a storm, were immediately driven back to Plymouth. In August they again set sail, and though they could not burn the Spanish ships which they now found in harbour, they succeeded in making captures to the amount of 100,000*l.*, with which booty they returned to England in October. The queen received Essex with reproaches and discontent, and the expedition was generally deemed a failure. He now retired to Wanstead, angry on several accounts: the chief of these was the elevation of the lord admiral to the earldom of Nottingham, by which he thought himself doubly affronted; first, because Lord Howard's services at Cadiz were recited, and, in the second place, because, by his new title, Lord Howard gained precedence of him according to a regulation made in the reign of Henry VIII. He was pacified by being appointed hereditary Earl Marshal, which by the same regulation restored him to his rank. In 1598 a quarrel occurred between the queen and Essex, who, having differed from her respecting an Irish appointment, angrily and contemptuously turned his back upon her in the presence of several of the ministers. The queen, unable to bear the affront, gave him a box on the ear, and bade him 'go and be hanged.' Essex immediately seized his sword, and the lord admiral stopping in between, he swore 'that he neither could nor would put up with an affront of that nature, nor would he have taken it at the hands of Henry the Eighth himself.' He withdrew from the court, and some months passed before he would make any submission, or suffer a reconciliation to be effected. His friends dated his ruin from this unfortunate circumstance. It was hastened by the death of Burleigh, which was on the whole a great misfortune to Essex. Had Burleigh lived, Essex might not have undertaken the unfortunate Irish expedition on which he at this time entered (1599). The province of Ulster was in a state of rebellion; and with the hope that his rank and military popularity and power might prevail in that country, he accepted the commission of lord lieutenant of Ireland. His government in that country was inconsiderate and ill-advised; and his opposition to the queen's wishes in the nomination of Lord Southampton to the generalship of the horse, which he was peremptorily ordered to revoke, gave great offence. His delay in sending troops to Ulster, the loss of men and money consequent on the delay, and the ultimate failure of the expedition, were the causes of many and loud reproaches. Essex returned to England in September: at their first interview the queen received him in a friendly manner, but on the following day he was put into 'free custody,' and detained a prisoner in his house. In June, 1600, he was denied the privileges and authority of his offices; and it was not until the 26th of August that he was liberated. The queen still denied him access to court, and refused the renewal of a valuable patent for the monopoly of sweet wines, which his friends used all their endeavours to procure, declaring that 'in order to manage an ungovernable beast, he must be stinted in his provender.'

The weight of these grievances upon his haughty and impetuous mind told the more heavily from the knowledge

that his general popularity was undiminished. So deep was his impression of resentment against those whom he conceived to have biassed the queen against him, that he listened to the rash and desperate advice of Cuffe, his secretary, to remove Cecil, Cobham, and Raleigh by force from the queen's councils. In order to strengthen his interest, the gates of Essex House were thrown open to all persons who were discontented with the queen or her advisers. With the same view, he courted both the Roman Catholics and Puritans, and a concourse met daily to hear sermons in his house. The multitude that attended the delivery of these discourses could not fail to attract the attention of the vigilant government. Essex was warned to be careful of his safety, and his attendance was required before the council. At this summons he took alarm, fearing a renewal of his imprisonment, and consequently the defeat of his scheme. He determined therefore to commence his proceedings on the following morning (Sunday, February 8, 1600-1); and during the night messengers were sent in all directions to acquaint Essex's friends that his life was threatened by Raleigh and Lord Cobham In consequence of this intelligence, Lords Sandys and Monteagle, the earls of Rutland and Southampton, with nearly 300 other gentlemen, assembled at Essex House, where it was divulged that Essex had resolved at once to rid himself of his enemies by forcing his way to the queen, and informing her of his danger from those who had so long abused their influence with her majesty. Essex having shut up within his gates the lord keeper, the chief justice, and others whom the queen, aware of what was passing, had sent to inquire into the cause of the tumult, proceeded with his friends to the city, where, crying 'For the queen, for the queen, a plot is laid against my life,' he tried to enlist the citizens in his favour. But notwithstanding his popularity, not one man took arms. The cause of the tumult was either mistaken or unknown. At length the earl endeavoured to return home, but a party of soldiers met him at Ludgate, and a skirmish ensued, in which he was twice shot through the hat. At length he reached Essex House, but after a short defence he was compelled to surrender himself, and with Lord Southampton was committed to the Tower: the rest of the conspirators were lodged in various other prisons. He was tried for treason in Westminster-hall on the 19th of February, condemned, and executed 25th of the same month. (*Criminal Trials*, vol. i.)

A sketch of the character of Essex has lately appeared in an article in the *Edinburgh Review* (vol. lxv., p. 21), which also displays the ingratitude of Lord Bacon towards his zealous friend and patron. We extract the following remarks:—'Nothing in the political conduct of Essex entitles him to esteem; and the pity with which we regard his early and terrible end is diminished by the consideration that he put to hazard the lives and fortunes of his most attached friends, and endeavoured to throw the whole country into confusion for objects purely personal. Still it is impossible not to be deeply interested for a man so brave, high-spirited, and generous: for a man who, while he conducted himself towards his sovereign with a boldness such as was then found in no other subject, conducted himself towards his dependants with a delicacy such as has rarely been found in any other patron. Unlike the vulgar herd of benefactors, he desired to inspire not gratitude but affection. He tried to make those whom he befriended feel towards him as towards an equal.' His mind was ardent and susceptible, and naturally disposed to the admiration of all that is great and beautiful.

He left one son (of whom we give an account in the next article) and two daughters. Frances married first the earl of Hertford, and afterwards the duke of Somerset. Dorothy was the wife first of Sir Henry Shirley, and lastly of William Stafford, of Blatherwyck, in Northamptonshire.

ROBERT DEVEREUX, third earl of Essex, was born in Essex House, in the Strand, in 1592. He was sent to Eton by his grandmother, who, after his father's death, received him into her house; and in 1602 he was removed to Merton College, Oxford, where the warden, Mr. (afterwards Sir Henry) Savile, who had been an intimate friend of his father, took charge of his education. He was restored to his hereditary honours in 1603, and three years afterwards was unhappily married to lady Frances Howard, a child of no more than thirteen years old. The new-married couple being too young to live together, Essex was sent to improve himself abroad; while the bride, who was celebrated for her beauty, continued with her mother. It was four years before he returned to claim his wife, and in the mean time she had contracted so great an affection for lord Rochester, afterwards earl of Somerset, that until she was compelled by her father, she could not be brought to cohabit with her husband. The union never was a happy one. Not many months after they had met, she instituted proceedings against him praying for a separation on a real or pretended charge of physical disability. A divorce was granted, and the lady was soon after married to lord Rochester. The slur thus cast upon Essex drove him to the retirement of his country-house and the pursuit of rural occupations. After some years however, a solitary life became irksome to him. Tired of inaction, he joined lord Oxford in 1620, raised a troop, and marched with the Elector Palatine in the war against Holland. In the winter he returned to England, where his opposition to the government rendered him unpopular at court; indeed the reception that he met with at home was so little agreeable that he willingly renewed his military avocations abroad during the two following summers, and in 1625 again raised a troop, with which he sailed to aid the United Provinces. His disposition and capability for military service now struck the king, and he was appointed vice-admiral of a fleet which was employed in a fruitless expedition against Spain. He engaged in another expedition in the Low Countries, and was afterwards bold enough to marry a second time. In this second choice of a wife (the daughter of Sir William Paulet) he was scarcely more fortunate than in his first. It is true indeed that the lady soon after her marriage bore a son, which Essex owned and christened after his name, but her familiarities with Mr. Uvedale gave him cause to suspect her fidelity, and after much mutual crimination, on the one side for inconstancy, on the other, a renewal of former charges, a separation took place. The child died at the age of five, and Essex never showed further inclination to matrimony. Between his journey to Ireland in 1632 and his appointment in the fleet that sailed to Holland in 1635, he spent his time either in his house at Chartley, or in London. His inclination to seek popularity among the presbyterians was evident and undisguised; nevertheless the king employed him as lieutenant-general of his troops that were sent against the Covenanters (1639). In 1640 he was one of twelve peers that signed a petition that a parliament should be called and an attempt made to settle the difficulties of the state without further bloodshed. He was also one of the commissioners sent to Ripon to treat with the Scots; and when, at the opening of the Long Parliament, the king saw that it was necessary that he should endeavour to conciliate the presbyterian party, he made Essex lord chamberlain. It was the wish of many of the royalists that Essex, whose popularity was great among the presbyterians, should also have been placed at the head of the army, but Charles, who disliked him on account of the roughness of his manner, and doubted the firmness of his attachment to him, refused to appoint him, and would yield to their requests no further than to make him lieutenant-general of his forces south of the Trent. When the Commons demanded of the king that a guard should be raised in the city of London, it was Essex whom they desired to have placed at its head. Charles, unwilling to listen to this request, left London suddenly, and called upon Essex to follow him; but Essex, indisposed to the king on account of the thankless incivility with which he had always been treated at court, refused to follow, pleading his duty to remain in attendance of parliament. Vehemently angry at this refusal, the king instantly deprived him of all his offices. Essex now became the chief favourite and leader of the parliamentary or presbyterian party. He became parliamentary general in 1642, and was in consequence proclaimed a traitor by the king. He opposed Charles in person at Edgehill (1642); he also took Reading (1643), but on account of a disease with which his troops were infected, he was obliged to abandon any further attack; at which the disappointment of the parliamentary leaders was so great, that they nearly dismissed him from his command. On the recovery and reinforcement of his soldiers he triumphantly entered Gloucester, from which he had driven the king away, surprised Cirencester, and after fighting courageously at the doubtful battle of Newbury, succeeded in covering London. As the supporters of the parliament were supposed to be numerous in Cornwall, in the hope of increasing his forces he marched to that county pursued

by the royalist troops; the number of adherents however had been exaggerated, his expectations were disappointed, and as he was completely hemmed in by his pursuers, the scarcity of provisions began to be severely felt. At this crisis the king proposed a treaty; but Essex had no authority to make any agreement without the sanction of his parliamentary masters; and as the royalists, finding that he did not comply with the king's offer, continued to press their advantage, after some of his troops had abandoned him, he was obliged to escape by sea from Fowey. Having sailed from Plymouth to London, he once more collected an army, and was placed at its head, but an illness compelled him to quit his command. When he returned to London he found a state of confusion and distrust that scarce could be exceeded. At a meeting held at his house it was proposed to impeach Cromwell, but this served no other purpose than to irritate that leader. The independents soon afterwards succeeded in carrying the 'self-denying ordinance,' which forbad members of either house of parliament to hold any command in the army: thus Essex ceased to be parliamentary general. It was voted that for his services he should be raised to the rank of a duke, and be granted a pension of 10,000*l.* a year. He did not however live to enjoy these honours, being carried off by a sudden and violent illness in the fifty-fifth year of his age. He was publicly interred in Westminster Abbey.

The chief defects in his character were indecision and vacillation; when he erred it was more from want of judgment than from bad intention. His bearing was always manly, and his courage has never been impeached. At his death the title became extinct. (Hume's *History of England; Biographia Britannica; Biographie Universelle.*)

ESSLINGEN, the seat of provincial government for the Würtemberg province of the Neckar, as well as for the bailiwic of Esslingen, lies in a fine and fertile country on the banks of the Neckar, surrounded by heights crowned with forests and vineyards, in 48° 44′ N. lat., and 9° 19′ E. long. It is an old town, and was a free city of the German empire, and the favourite residence of some of the emperors. The inner town has massive walls and towers round it; and the five suburbs, one of which stands on an island in the river, while another is attached to the old burg which lies upon a hill, are also protected by stout walls. It has five churches, that of St. Mary being distinguished by its fine Gothic spire, a handsome town-hall, an hospital richly endowed with the property of some suppressed religious houses, a high school, the head seminary of the kingdom for educating teachers, an orphan asylum, several elementary schools, and a population of about 6250, of whom about 100 are Roman Catholics and 100 Jews. Esslingen has manufactures of woollens, cotton and woollen yarns, wine, lackered iron and tin ware, paper, &c., and a good trade in agricultural produce. The parish of Esslingen comprises the well-known Esslingen-Gebiet, a succession of hamlets scattered along the heights between the town and Rothenberg, and carried up to the very summit of the range.

ESSLINGEN, or **ESSLING**, is likewise the name of a small village of about 280 inhabitants, in the circle of the Lower Mannhartsberg, in Lower Austria, about seven miles east of Vienna. It is connected by historical recollections with the adjacent village of Aspern which lies to the west of it. The ground between these two places was the scene of a severe conflict between the French under Napoleon, and the Austrians, which begun on the 21st and terminated on the 22nd of May, 1809, when the latter remained in possession of Aspern, and the former of Esslingen. By the Austrians the conflict was therefore called that of Aspern; but by the French that of Essling, from which village Marshal Massena covered the retreat of Napoleon's forces, and afterwards derived the ducal title bestowed upon him by the French emperor.

ESSOIGNS, Latin *Essonium*, French *Essoigne*, or *Exoine* (apparently from the Latin *Exonerare*, to exonerate, but see Du Cange, in voc. *Sunnis*), is the allegation of an excuse for non-appearance by a person summoned to answer an action at law, or to perform service at a court baron. There were various causes of excuse, such as illness, falling among thieves, floods, &c.

A party might essoign himself three times by sending a substitute to explain the reasons for his non-appearances, and it formerly served as an imparlance or a craving for a longer time by a defendant to make answer in real and mixed actions

Essoign day of the Term. The first return day in every term was, properly speaking, the first day of the term (until essoigns were no longer allowed to be cast in personal actions), and on that day the courts sat to take essoigns or excuses from such as did not appear to the summons or the writ; wherefore it was called the essoign day.

The essoign or general return day is now regulated by 1 William IV., chap. 3, which enacts 'That all writs usually returnable before any of his majesty's courts of King's Bench, Common Pleas, or Exchequer, respectively, on general return days, may be made returnable on the third day exclusive, before the commencement of each term, or on any day, not being Sunday, between that day and the third day exclusive before the last day of the term; and the day for appearance shall, as heretofore, be the third day after such term.'

ESTATE, in law, signifies that title or interest which a man has in lands, tenements, hereditaments, or other effects. It is either real, comprising lands, tenements, and hereditaments held or enjoyed for an estate of freehold; or personal, comprising interests for terms of years in lands, tenements, and hereditaments, and property of every other description. Personal estate [CHATTELS] goes to the executors, and is primarily liable for payment of debts.

Real estate may be considered under three heads:—(1) the quantity of estate, *i. e.*, the amount of interest in the owner; (2) the time when that interest is to commence; and (3) the quality of estate, or the mode in which it is to be enjoyed.

1. All real estates not being of copyhold tenure [COPYHOLD], or what are called customary freeholds, are either of freehold or less than freehold. The former may be divided into two kinds; freeholds of inheritance, and freeholds not of inheritance. Freeholds of inheritance admit of a further subdivision, into inheritances absolute, called fees simple, and inheritances limited, called qualified or base fees, and fees conditional. A freehold of inheritance absolute or fee simple is the largest estate which the law allows to a subject; the owner may freely dispose of it to whom he pleases in his lifetime by deed or by will, and if he dies without making any disposition, it descends to such of his kindred as the law marks out as his heir.

A qualified or base fee has some qualification or limit annexed, which may determine the estate, as in the instance of a grant to A and his heirs *tenants of the manor of Dale.* Whenever A or his heirs cease to be tenants of that manor, their estate is entirely determined, though during its continuance the proprietor has the same rights and privileges as if he were absolute tenant in fee simple.

A conditional fee at common law was a fee restrained to some particular heirs exclusive of others, as to a man and the heirs male of his body, by which limitation his lineal heirs female and collaterals were excluded; and this is the origin of estates tail. It was held that if the donee, in the case supposed, had no heirs male of his body, or if, after a male child was born, no alienation were made, the land should revert to the donor on the failure of heirs male of the donee's body: in fact, for all purposes of alienation it was a fee simple, on condition that the donee had male issue; for it is a rule of law, that when any condition is performed it is thenceforth entirely gone, and the thing to which it was annexed becomes absolutely and wholly unconditional. The nobility however, being anxious to preserve their estates in their own families, procured the Stat. Westm. the Second, 13 Ed. I., c. 1, commonly called the Statute de Donis Conditionalibus, to be made, which enacted that the will of the donor should be observed, and that the land should go to the heirs specified, if there were any, or if none, should revert to the donor. Thus the donor acquired an estate in reversion, which could only be allowed, consistently with the nature of estates in reversion, by considering the conditional fee to be changed into a limited, or, as it is called in technical language, a particular estate. This kind of estate was called an estate *tail*, from the word *talliare*, to cut, being as it were a portion of the whole fee. Means were soon however discovered by the ingenuity of the lawyers to enable the donee and his heirs of the specified description to cut off the entail, as it was called. [CONVEYANCE, FINE, RECOVERY.]

A freehold, not of inheritance, is an estate which the owner has for his own life only, or the life of some other person, or until the happening of some uncertain event. The following are instances:—A gift to A until B returns from Rome; but if the gift had been to A and his heirs

until B returns from Rome, the estate would have been a qualified or base fee; and if B had died without returning from Rome, would have become a fee simple absolute. Some freeholds not of inheritance, arise from operation of law, as tenant in tail after possibility of issue extinct, which is where an estate is limited to A and the heirs of his body to be begotten on the body of B his wife, which is called an estate tail special (as distinguished from an estate tail general, *i.e.* to A and the heirs of his body, without specifying the woman from whom they must spring). If B dies without children, A is no longer tenant in tail, but tenant in tail after possibility of issue extinct, and is regarded by the law, as to the duration of his estate, as simple tenant for life. As to tenant by courtesy and tenant in dower, see COURTESY and DOWER.

Of estates less than freehold there are three kinds—estates for years, at will, and by sufferance. An estate for years (which includes an estate from year to year) is personal property, and, like other chattels [CHATTELS], upon the death of the owner, without having disposed of it in his lifetime, devolves upon his executors or administrators. An estate at will arises where a man lets lands to another expressly at the will of both parties or without limiting any certain estate; either party may put an end to the tenancy, though, for the sake of general convenience, the courts strive to construe them as tenancies from year to year, for the purpose of rendering a six months' notice necessary to their determination. An estate by sufferance arises where a tenant, who has entered by lawful title, continues in possession after his interest has determined: this estate may be put an end to at any time by the lawful owner, though, after acceptance of rent, the law would consider it as a tenancy from year to year, as in the case of a tenancy at will.

Neither of these two last estates confers any power of alienation. All these estates, real and personal, freehold or less than freehold, freeholds of inheritance or not of inheritance, may become subject to another qualification, and be called estates upon condition, being such whose existence depends upon the happening or not happening of some uncertain event whereby the estate may be either originally created or enlarged or finally defeated. [CONDITION; MORTGAGE.]

2. Estates are either in possession or in expectancy. The former kind of estate requires no explanation here. The latter, involving some of the nicest and most abstruse learning in English law, are divided into estates in remainder and reversion, and by executory devise or bequest; and again, remainders are divided into estates in remainder vested or contingent. [REMAINDER; REVERSION.] An executory devise or bequest is such a limitation of a future estate or interest in lands or chattels as the law admits in the case of a will, though contrary to the rules of limitation in conveyances at common law. It is only an indulgence allowed to a man's last will and testament, where otherwise the words of the will would be void; for wherever a future interest is so limited by a will as to fall within the rules laid down for the limitation of contingent remainders, such an interest is not an executory devise, but a contingent remainder. [WILL.]

3. Estates may be enjoyed in four ways; in severalty, in joint tenancy, in coparcenary, and in common.

An estate in severalty is when one tenant holds it in his own right without any other person being joined with him.

An estate in joint tenancy is when an estate is granted to two or more persons at the same time, in which case the law construes them to be joint tenants unless the words of the grant expressly exclude such construction; they have unity of interest, of title, of time of vesting, and of possession, and upon the decease of one, his whole interest, unless disposed of by him in his lifetime, remains to the survivor or survivors.

An estate in coparcenary is when an estate of inheritance descends from the ancestor to two or more persons, who are called parceners, and amongst parceners there is no survivorship.

An estate in common is when two or more persons hold property, by distinct titles and for different interests, but by unity of possession.

All these three last-mentioned modes of joint and undivided possession may be put an end to by the parties interested, either by prescribed modes of conveyance or by partition. [PARTITION.]

Estates are also legal or equitable. It is a legal estate when the owner is in the actual seisin or possession, and also entitled to the beneficial interest himself or in trust for some other person. An equitable estate is when some other person, not the person who is the actual and legal owner, is entitled to the beneficial interest of the property of which that other is in possession. The power of the beneficial owner over his equitable estate is as complete as if he were possessed of the legal estate. [TRUST; EQUITY.]

ESTE, HOUSE OF, one of the oldest historical families of modern Europe, and the oldest among those which have retained sovereign power to the present time, the house of Savoy perhaps excepted. Some chronologists, such as Pigna, have endeavoured to trace back the genealogy of the house of Este to the fifth century of our æra, when we find the names of Atius, Aurelius, and Tibérius mentioned as princes of Este, Vicenza, and Feltre. But to pretend to ascertain the lineal succession of these princes down to the ninth century is a matter at least very dubious. The more sober and judicious Muratori, in his 'Antichità Estensi,' has traced the ancestry of the Este to the dukes and marquises who governed Tuscany as a great imperial fief under the Carlovingian emperors, and who were probably, like most other great Italian feudatories at that time, of Longobard origin. Some old chroniclers, such as Mario Equicola, in his 'History of Mantua,' state positively that they were Longobards, and related to the Longobard dukes of Spoleto. The succession, however, of these marquises or dukes, among whom are registered two of the name of Adalbert, in the ninth century, is not clearly ascertained until we come to another Adalbert, who is styled marquis, but of whom little is known, and who died about A.D. 917. He left, however, two sons, Guido and Lamberto, who were stripped of their fiefs by Hugo and Lotharius, kings of Italy. A son or nephew of either Guido or Lamberto, named Oberto, took the part of Berengarius II., who was elected king of Italy about A.D. 950; and this Oberto was possessed, either by inheritance or through the favour of Berengarius, of several fiefs in Tuscany and Lunigiana. Being afterwards dissatisfied with the conduct of Berengarius, he was one of the Italian nobles who repaired to Otho of Saxony to offer him the crown of Italy. Otho, on his exaltation, appointed Oberto comes sacri palatii, which was one of the first dignities of the kingdom, and gave him in marriage his daughter Alda. Oberto died about the year 972, leaving two sons, Adalbert and Oberto II., the latter of whom was lord of Lunigiana and of the county of Obertengo in Tuscany. Oberto took the part of Hardouin, marquis of Ivrea, against Henry of Bavaria, for the crown of Italy. Oberto died about 1014, and was succeeded by his son, Alberto Azzo I., who in his turn was succeeded by his son Alberto Azzo or Albertazzo II. This Albertazzo, besides his paternal fiefs of Lunigiana and Tuscany, inherited also from his uncle Ugo the fiefs of Este, Rovigo, and Casalmaggiore, in Lombardy. In the year 1045 he was appointed by the emperor Henry III. count and governor of Milan; and soon after he married Kunitza, or Cunegonda, of the great German house of Welf, and sister to Welf III., on whom the Emperor Henry had bestowed the duchy of Carinthia and the march of Verona. Welf III., dying without issue, his inheritance fell to his sister's eldest son by Albertazzo, who took the name of Welf IV. This Welf IV. was made duke of Bavaria about 1070, and from him the line of Brunswick and Hanover, known also by the name of Este-Guelphs, is descended.

Albertazzo having lost his German wife, married Garisenda, countess of Maine in France, by whom he had two sons, Folco and Hugo. To Folco he left his Italian estates, and Hugo inherited the French property of his mother, namely, the county of Maine, which he afterwards sold. Hugo married a daughter of Robert Guiscard, the conqueror of Naples, and died without issue. Muratori transcribes a diploma of the emperor Henry IV., dated A.D. 1077, confirming the possessions of the Italian fiefs to Hugo and Folco, sons of the marquis Azzo of Este. Folco after his father's death was sued by his half-brother Welf for a share of his paternal inheritance; but after a long contention, an arrangement was made by which Folco retained the greater part of the Italian estates, including the fief of Este. Folco died in 1135, and his son Obizzo succeeded him. Like his father, he assumed the title of marquis of Este, from the town of that name, by which his house was designated ever after. The town of Este, built near

the ruins of the antient Ateste, lies in the Venetian state, north of the Adige, in the province of Padua. The emperor Frederic Barbarossa, at a court held at Verona, A. D. 1184, bestowed upon Obizzo the investiture of the marquisates of Milan and Genoa, which were then merely nominal, as the two cities had become free; yet the emperors would not discontinue the prerogative of appointing the titular marquises of those former imperial jurisdictions.

In Obizzo's time the foundation of the dominion of the House of Este over Ferrara was first laid. The family of Adelardi had long been the popular leaders at Ferrara, and enjoyed the chief authority in that community. Marchesella, the last offspring of this family, was betrothed by her uncle and guardian Guglielmo on his death bed to one of the Torelli, a rival family. But the girl was carried away and compelled to marry Azzo of Este, the son of Obizzo, and from that time the Este were considered as citizens of Ferrara. 'A veil has been thrown over the whole transaction, which seems to imply that fraud or violence had been committed.' (Litta, *Famiglie celebri Italiane.*)

This Azzo, styled the Fifth, died about the end of the twelfth century, and was succeeded by his son Azzo VI., who was elected in 1208 by the citizens of Ferrara as vicar or lord of that city, with power to appoint his successor. 'This,' says Litta, 'was the first example of a free Italian city giving itself over to a lord, and the beginning of those numerous principalities into which Italy became divided.'

Aldobrandino succeeded his father Azzo VI. in 1212, and was himself succeeded by Azzo VII., called also Azzo Novello, who took part with the Pope against Frederic II.; for the Este were naturally of the Guelph party. He was mainly instrumental in the fall of the tyrant Eccelino: he favoured learning, patronized the Provençal troubadours who resorted to his court at Ferrara, and established schools in that city. He was succeeded by Rinaldo, and the latter by Obizzo in 1252. Obizzo was elected lord of Modena in 1288, and of Reggio in the following year, according to the prevailing fashion of the Italian cities at that period. These lordships of Ferrara, Modena, and Reggio, however, were not held by the Este in undisturbed possession, for they were repeatedly invaded and recovered during the frequent wars of the Italian states in the fourteenth century. While the family of Este were acquiring a princely dominion, they lost the original fief from which they derived their name. About 1293 the Paduans took possession of the town and territory of Este by conquest, and annexed it to their community. It afterwards, in 1405, passed into the hands of the Venetians. (Alessi, *Ricerche Istorico-Critiche delle Antichità di Este.*)

Nicholas, called 'the Lame,' one of the successors of Obizzo, was vicar of Ferrara from 1377 to 1389: he fought for the pope against Barnaba Visconti, duke of Milan. He was succeeded in 1389 by his brother Albert, and Albert by another Nicholas, who died in 1440, leaving two legitimate sons yet in their infancy, and several natural sons grown up, to one of whom, Lionel, he bequeathed his dominions. Lionel proved a good prince: he restored the university of Ferrara, and after nine years of a mild and liberal administration he died in 1450, leaving the government of the state to his brother Borso, who was illegitimate like himself. Borso was one of the most distinguished princes of his age. He was a patron of arts and letters, and was generous, enlightened, and just. He recalled his two legitimate brothers, Ercole and Sigismondo, from Naples, treated them with brotherly affection, and in order to secure the succession to them after his death, he abstained from marrying. In 1452 Borso received from the emperor Frederic III. the titles of duke of Modena and Reggio and count of Rovigo; and in 1471 pope Paul II. gave him the title of duke of Ferrara, upon which town the Roman see claimed a right of patronage. Borso died soon after, leaving a large and prosperous state to his brother Ercole. 'More fortunate than Lorenzo de' Medici, who lived in the same age, Borso had not to encounter the violence of parties and opinions; he ruled over a contented and submissive population, and while the conspiracies against Lorenzo were looked upon as acts of patriotism, those against Borso were considered as private plots, the result of personal envy and malice; so that when he had occasion in 1451, 1459, and 1469, to punish several conspirators with all the severity of the laws, he did not lose on that account the veneration of his subjects. He enjoyed a great reputation for uprightness, and his fame spread so far that he received presents from some Indian princes, who believed that he was king of Italy.' (Litta, *Famiglie celebri Italiane.*)

His successor Ercole I. was likewise a man of considerable talents and a patron of literature. He was also remarkable for that wary and cautious policy which has been stigmatized as peculiarly Italian, but which was in reality indispensable to the Italian princes in order to protect themselves from the overbearing violence of foreign invaders, after Ludovico Sforza through ambition committed the suicidal act of calling the French into Italy. Ercole checked the fury of Louis XII., who, after he had driven the Sforzas from Milan, was bent on exterminating all the other Italian princes. Ercole was fond of travelling: he visited the various Italian courts, and encouraged tournaments, festivals, and hunting parties. He gave the first theatrical entertainments exhibited at Ferrara, where the Menæchmi of Plautus was performed in 1486. His court was frequented by Bojardo, Collenuccio, Tibaldeo, Guarino of Verona, and other learned men of his time. He caused many Greek MSS. to be translated, and had a Hebrew press established at Ferrara in 1476.

Alfonso I., son of Ercole, succeeded him in 1505. He married the daughter of Pope Alexander VI. [BORGIA, LUCREZIA.] Alfonso had a long and troubled reign. He was attacked by Julius II. and the Venetians; he lost Modena and Reggio, and the Venetians also threatened Ferrara. The death of Julius afforded him some respite. Leo X. continued to withhold Reggio and Modena from him, and made also an attempt to surprise Ferrara. Alfonso displayed considerable abilities and great perseverance. He and his brother, Cardinal Ippolito, the patron of Ariosto, often took the field in person: their artillery was the best served in Europe; and they defeated the Venetians. After the death of Leo X., Alfonso, who had till then sided with the French, made his peace with Charles V., who by an imperial decree dated 21st April, 1531, confirmed the rights of the house of Este over Modena, Reggio, and Rubiera, upon the duke paying him 150,000 sequins; and thus Alfonso was restored to the possession of those states. Alfonso died in 1534 and was succeeded by Ercole II., and the latter by Alfonso II., who is unfavourably known by the misfortunes of Tasso, which however the poet brought upon himself. Litta is of opinion that Tasso was in love with Eleonora the duke's sister, and that her sister Lucrezia was in love with him. 'In 1575 Tasso was sent away from Ferrara, his papers were seized, and among them were found poems with such images and descriptions as ought never to have been written.' Tasso was subsequently confined to the madhouse of St Anna, from which he was liberated after seven years, by the intercession of Vincenzo Gonzaga, prince of Mantua, who came to Ferrara for that purpose. [TASSO.] Alfonso II. dying in October 1597, without issue, Pope Clement VIII. immediately sent Cardinal Aldobrandino with troops to take possession of Ferrara as having devolved to the see of Rome, which had first invested Borso with the title of Duke. Cesare d'Este, Alfonso's cousin and heir, entrusted Lucrezia, Alfonso's sister, with full power to negotiate. Lucrezia, who had hated the Marquis of Montecchio, son of Alfonso I. and father to Cesare, on account of the share he had taken in the transactions of 1775 relative to Tasso, disliked Cesare also. Cardinal Aldobrandino having offered her the title and revenues of Duchess of Bertinoro in the Romagna, she signed a hasty convention, by which she gave up, in the name of the house of Este, Ferrara, Comacchio, and their dependencies, to the see of Rome. Cesare transferred his court to Modena, and Lucrezia died at Ferrara a few days after the entrance of the Papal troops, in February, 1598. The city of Ferrara, which, under the house of Este, had a population of 60,000 inhabitants gradually became reduced to 20,000.

Cesare, duke of Modena and Reggio, died in 1628. His son Alfonso III., who had remained as hostage at Ferrara, had shown in his youth marks of a violent disposition. In 1619 he caused Ercole Pepoli to be assassinated at Ferrara. Stung by remorse, he abdicated the ducal crown soon after his father's death, and became a Franciscan monk. He distinguished himself as a zealous preacher, and founded several convents. 'But,' says Litta, 'he could not totally change his nature. He was still a lion under the coarse tunic and hood. He was treated by the other monks with all the deference due to his rank, but was closely watched to prevent his doing mischief. He died in 1644, in a convent in the mountains of Garfagnana, which he had founded.' His

son Francis I. was not much better than his father. He affected a great zeal for religion, had his food scrupulously weighed on fast days, and he sentenced a relative of Marshal Gassion to be shot for want of proper respect while at church. He first separated the Jews from the rest of the population at Modena in 1630, and confined them to the Ghetto. He began the magnificent ducal palace at Modena as well as the country residence and gardens at Sassuolo. His successor, Alfonso IV., received in 1660 of the emperor Leopold the investiture of the principality of Correggio, which he had previously purchased. Alfonso loved the fine arts, and he was the founder of the Este gallery of paintings. He left at his death a son two years old, who was afterwards duke by the name of Francis II. During his minority his mother, Laura Martinozzi, Cardinal Mazarin's niece, held the government. She collected together all the bad characters in her dominions, and delivered them over to the Venetians, who employed them in the war of Candia against the Turks. Francis II. founded the university of Modena as well as the splendid library called Estense, of which Zaccaria, Muratori, and Tiraboschi were successively librarians. Francis II. dying in 1694 without issue, was succeeded by his uncle, Cardinal Rinaldo, who, after resigning his hat, married a daughter of the Duke of Brunswick Lunenburg, and sister-in-law to the emperor Joseph I. By this marriage the two branches of Este and Brunswick, which had been separated since 1070, became again connected. During the war of the Spanish succession, the Duke Rinaldo, notwithstanding his professed neutrality, was obliged by the French to quit Modena and to take shelter at Rome. The victorious Austrians, commanded by Prince Eugene of Savoy, restored him to his dominions, where he resided quietly till 1733, when the war for the succession to the crown of Poland, in which Italy had no concern whatever, but for which Italy was as usual devastated by the belligerents, obliged Rinaldo again to leave his territories, which became the theatre of war between the French and Piedmontese on one side, and the Austrians on the other. In 1736 Rinaldo returned to Modena. His repeated misfortunes affected and perhaps improved his disposition: he became serious and economical after having been inclined to pomp and magnificence. He enlarged his dominions by the purchase of the duchy of Mirandola and the county of Bagnolo. Rinaldo was succeeded in 1537 by his son Francis III., who was serving in Hungary against the Turks at the time. During the war of the Austrian succession he took part for the house of Bourbon, and commanded the Spanish armies in Italy. The peace of Aix la-Chapelle restored him to the quiet possession of his dominions. In 1754 Duke Francis was appointed by Maria Theresa governor of Lombardy during the minority of her son the Archduke Ferdinand, who was betrothed to the duke's grand-daughter Beatrice d'Este, a child then four years old. In 1771 Francis gave up his trust to the Archduke Ferdinand, but continued to reside in Lombardy, and died at Varese in 1780. His son Ercole Rinaldo, the father of Beatrice, succeeded him as duke of Modena. His administration was peaceful and economical. He was ever watchful against the temporal interference of the court of Rome in his dominions; and he was equally averse to the remains of feudality which still lingered in his states. When the French entered Italy in 1796, the duke made a convention with Bonaparte, paid a heavy contribution, gave up some valuable paintings, but not trusting to the faith of the conqueror, he withdrew to Venice with his treasures, leaving a council of regency at Modena. An insurrection excited at Reggio by some Corsican soldiers in the French service afforded a pretext to Bonaparte to violate the convention, and to occupy the states of Modena, which were afterwards annexed to the Cisalpine republic. (Botta, *Storia d'Italia;* Paradisi, *Lettere a Carlo Botta.*) When in the following year the French occupied Venice, the duke had escaped to Trieste, but a deposit of 200,000 sequins which he had left behind was seized. Ercole Rinaldo died in the Austrian States in 1803. His daughter Maria Beatrice, the last offspring of the house of Este, lost her husband, the Archduke Ferdinand of Austria, in the year 1800, and their eldest son, Francis IV., was restored by the peace of Paris in 1814 to the dominions of his maternal ancestors, namely, the duchy of Modena, Reggio, and their dependencies, including the district of Garfagnana, on the borders of Lucca. By the death of his mother he has also inherited the duchy of Massa and Carrara, of which his grandmother, of the house of Cibo Malaspina, was the heiress. [CARRARA; MODENA.]

ESTELLA. [NAVARRE.]

ESTHER, The Book of, a canonical and historical book of the Old Testament, placed after that of Nehemiah, but coming chronologically between the 6th and 7th chapters of Ezra. It is thus denominated from the Persian name of the Jewish woman, Hadassah, whose history it relates. She was an orphan niece and adopted daughter of Mordecai, from a Benjamite family of the Babylonian captives of Nebuchadnezzar (ii. 5-7). The scene of the narration is in the city Shusan, or Susa, now Sus (not Shuster, as stated by Dr. Adam Clarke—see *Trans. Geog. Soc.*, vol. iii.), which, throughout the book, is in English mistranslated Shushan the *palace*, though, in the Septuagint version, it is rightly ἐν Σούσοις τῇ πόλει, that is, 'in Susa the city.' Augustin, Epiphanius, and Isidore supposed the author to have been Ezra. Eusebius assigns a later date. Some writers have attributed it to the high priest Joachim; others believe it to have been composed by the Jewish synagogue, to whom Esther and Mordecai wrote (ix. 20-29); but by the greater number Mordecai himself is thought to be the author, and Elias Levita, in his Mass. Hamum, asserts this to be a fact unquestionable. The original, according to Dr. Adam Clarke, was probably written in the language of antient Persia. St. Hieronymus and several other fathers regarded this book as wholly uncanonical, because the name of God or religion is not once mentioned or alluded to, and they have been followed by some modern writers, as Cajetan and De Lyra; but the Council of Trent pronounced it to be wholly canonical; and while the Protestant churches admit into the canon only what is found in the Hebrew copies, that is, as far as to the end of the third verse of chap. x., the Greek and Roman churches use as canonical the Greek version and Latin Vulgate, which contain each ten more verses of chap. x. and six additional chapters. By the Jews the book has been always considered as one of the most precious of their sacred scriptures, and as a perfectly authentic history of real events which took place about B.C. 519. They call it מגילה, Megilah, that is, *The* Volume, and hold it in the highest estimation; believing that whatever destruction may happen to the other scriptures, Esther and the Pentateuch will always be preserved by a particular Providence. Copies exist in the Hebrew, Syriac, Chaldaic, Greek, and Latin; each of which widely differs from the others, and all, especially the Greek and Chaldaic, are greatly different from the Hebrew. The Chaldaic text contains five times more than the Hebrew, and a notice of the various readings would fill a large volume. (See the London Polyglot Bible.) Commentators differ much in determining to which of the Persian and Median kings belongs the name of Ahasuerus, whose kingdom extended from India to Ethiopia over 127 provinces (i. 1). Some suppose him to be Darius Hystaspes. Scaliger and Jahn say Xerxes. By Capellus he is identified with Ochus, and by Archbishop Usher with Darius the son of Hystaspes. Dean Prideaux and Dr. Adam Clarke with greater probability take him to be Artaxerxes, who received the cognomen of Longimanus, or Longhanded. The following is a brief abstract of the book of Esther in the words of the text. This monarch (chap. i.), after having entertained all his nobles and princes with sumptuous festivity during more than six months, gave a great feast in his palace garden to all the men of Susa, great and small, while the women were separately feasted by the queen in the royal house. To the men royal wine was supplied in abundance, and the drinking was according to every man's pleasure; when, the king being, on the seventh day, merry with wine, sent his seven chamberlains with orders to bring the queen to exhibit herself (the Talmud says naked) before his guests; but Vashti (which in Persian means the beautifully fair) refusing to come, he was very wroth, and his anger burned within him. Ahasuerus however punished her by degradation and banishment, and by his royal mandate letters were despatched to the people of each province, decreeing that every man bear rule in his own house. To furnish the royal harem with the greatest means of choice there was made throughout the empire (ch. ii.) a general levy of the fairest virgins, and Esther, the beautiful young Jewess, being preferred by Hege, the keeper of the king's women, before all others of the numerous assemblage, she succeeded to the place of the banished queen Vashti. The twelve months' cosmetical purification of the maidens previous to their admission to the king (ver. 12) was required, says Dr. Clarke,

'to show if they were with child, that the monarch might not be imposed on by fathering a spurious offspring and because many having been brought up in low life and fed on coarse, strong, and indigestible food, they had a copious and strongly odorous perspiration, which was far from pleasant.' Esther's foster father, Mordecai the Jew (chap. ii), having refused to do reverence to Haman, the chief minister and favourite of Ahasuerus, he, with all the other Jews from Babylon, then dispersed throughout the Persian empire, were by Haman devoted to destruction, and the royal mandate being accordingly issued 'to destroy, to kill, and to cause to perish all Jews, young and old, little children and women, in one day, and to take the spoil of them for a prey' (ver. 13), the king and Haman sat down to drink; but the fickle tyrant, influenced in the mean time by the pathetic entreaties of Esther, and by the recollection that Mordecai had discovered a conspiracy against his life, was induced to hang his favourite Haman on a gallows thirty yards high, which that minister had prepared for Mordecai. He then promoted Mordecai to the highest honours in the empire; and still yielding to the influence of the fair Jewess and of Mordecai, he hastily issued orders empowering all the Jews 'to destroy, to slay, and to cause to perish all the people that would assault them, both little ones and women, in one day, throughout all the provinces of King Ahasuerus, and to take the spoil of them for a prey' (viii. 11 [illegible]); so that 'the Jews smote all their enemies with the sword with slaughter and destruction, and did what they would unto those that hated them' (ch. ix. 5). By the special request of Esther the ten sons of Haman were hanged on the gallows, and in the city of Susa the Jews massacred eight hundred of the king's Persian subjects, and in the provinces seventy-five thousand (ix. 12, 15, 16). This signal revenge of Haman's intended [illegible] of the Jews in Persia has ever since been commemorated (ix. 2[illegible]) on the 14th and 15th days of the month Adar, in the Jewish 'Feast of Purim,' that is, in Persian, *the lots*, with reference to those which on this occasion were cast before Haman (ch. iii. 7; ix. 24); and the lower class of Jews, like the similar class of Irish with respect to St. Patrick's day, [illegible] it a [illegible] on these Days of Purim to be drunk as a [illegible] duty. It is here worthy of remark that the word which in the authorized version is repeatedly translated *gallows* should properly be *cross* or *tree*. Hence it was that in the first ages of Christianity the Jews, when celebrating this feast of Purim, were accused of deriding the Christian crucifixion, in abusing and setting fire to an effigy of Haman affixed to a lofty wooden *cross*, a custom which, on this account, was abolished in the Roman empire by the decrees of Justinian and Theodosius. It has been observed that apparently the only good moral sentiment derivable from the statements of this book, the inspired authority of which was doubted by several early fathers, is a detestation of the sensuality and cruelty of such royal despots as the king Ahasuerus. (Dr. Prideaux's *Connection of the Old and New Test.*; Horne's *Introduction to the Bible*; *Commentaries* by Dr. A. Clarke and others; *Lectures on the Book of Esther*, by Dr. Lawson, 1809; *Eclect. Review*, vol. iii.; Calmet's *Dict. of the Bible*; Dr. A. Clarke's *Succession of Sacred Literature*.)

ESTHONIA, or REVAL, a Russian government or province constituting one of the five provinces included in the grand subdivision of Russia in Europe which is called the Baltic (East Sea) Provinces. It is not known by this name among the native inhabitants, but by that of 'Wiro[illegible]a' border land, or 'Meie Maa,' our land. The boundaries of Esthonia are, on the north, the gulf of Finland; on the east, the government of St. Petersburg; on the south, lake Peipus and the government of Livonia; and on the west, the Baltic. It was subjugated by the Danes in 1220, and in 1346 sold by them to the Teutonic knights, whose grand master, the first duke of Livonia and Esthonia, acknowledged the king of Poland as lord paramount in 1561. After being an object of continued contest between the Russians, Poles, and Swedes, it became at length a province of Sweden in 1660. It was wrested from the Swedish crown by Peter the Great in 1710, and was ceded finally to Russia under the treaty of Nystadt in 1721. Including the islands of Dagoe, Worms, Wrangel, Nargen, the two Roogs, Odensholm, Nuckoe, Eckholm, Heft, Kranholm, and fifty-nine smaller islands, the total area of this government is 6804 square miles, of which one thirty-fifth part belongs to the seventy islands. The extent of coast is about 260 versts, or 173 miles, and the population, which was 196,285 in 1783, 227,001 in 1819, and 229,398 in 1828, is now estimated at about 240,000. The general character of the surface is level, occasionally varied by isolated hills and eminences, which the people of the country denominate mountains. The northern coast, from Reval or Revel to Narva, is several fathoms higher than the Baltic, and strewn with masses of granite; the western coast is lower, but both are edged for some miles inland by a deep bed of sand. The soil of the interior districts of Esthonia, which are the most fertile, is a mixture of loam, sand, and clay; in all parts are large swamps, many of which are impassable, except when hardened by the frosts of winter. The proportion of the cultivated to the uncultivated and wooded soil is estimated by Bienenstamm at one part only in three.

Esthonia contains 228 small lakes, besides the northern end of lake Peipus and the left bank of the Narova, which flows out of the Peipus into the Baltic and divides the government from that of St. Petersburg. This province has no streams but rivulets and brooks, some of which flow under ground, and occasionally contain pearl muscles. There are sulphurous and saline springs.

Though the temperature is moderate when compared with that of the adjacent provinces, the winter is of long duration, and winds and fogs prevail throughout the year.

The soil, though deficient in fertility, yields more than sufficient for the maintenance of the population. Agriculture is the principal branch of industry, and about one fifth of the whole surface is under the plough. The chief crops are barley and oats; some wheat, Indian corn, hemp, flax, hops, and tobacco are also raised. The whole produce of grain is estimated at [illegible]00,000 quarters, which being more than is consumed, the surplus, about 180,000, is applied to making brandy. The Weissenstein districts in the south-east produce much hemp and flax. As the harvest season is attended by heavy rains, the farmers have subterranean [illegible] in most parts, into which the harvest grain is carried for the purpose of being dried. Esthonia has large meadows, and produces abundance of hay; it has likewise good grazing grounds. Vegetables are of universal growth, but little attention is given to fruits. The woods and forests, composed of the fir, pine, elm, birch, larch, and beech, occasionally intermixed with the oak, alder, linden, crab-apple, &c., spread over an area of about 3300 square miles; they are densest in the eastern districts of Wesenberg and Weissenstein.

Next to agriculture, the rearing of cattle is the most important branch of rural industry. The native horse is small in stature, but strong and enduring, and the breeds called the Reval Klepper and Doppelklepper are in much esteem. The horned cattle are small, but afford much milk, and large droves of oxen from the Ukraine are fattened for the St. Petersburg market. Much has been done to improve the breed of sheep, which are of the German white or blackish species. Goats, swine, and poultry are reared in great numbers. The wild animals are the bear, wolf, fox, badger, marten, and squirrel; a few elks are to be met with in the Wesenberg forests. The fisheries along the coast and in lake Peipus are very productive. The mineral products are stone for building, potter's clay, and gypsum; there is abundance of peat.

The majority of the inhabitants are Esthonians; they are of Finnish descent, of diminutive stature, and have light-coloured hair in general, blue eyes, a small flat nose, and flattened countenance. They were sunk until late years in abject slavery. The landholders are universally of German or Danish extraction, and constitute the aristocracy of the country, and there are some Russians and a few Swedes and Finlanders intermixed with them. In 1819, when the population amounted to 2[illegible]7,001, it comprised 210,240 Esthonians, and 88[illegible]6 Germans. In 1830, when it amounted to 228,000, the number of births was 10,881, and deaths 70[illegible]. In 1828, when it was 229,398, the towns contained 21,[illegible]3, and the rural districts 20[illegible],33[illegible]; in that year also the number of males was 100,363, and females 104,972.

Esthonia contains [illegible]63 estates, which, with the exception of eight, the property of the crown, and [illegible] belonging to the clergy, are in the hands of the nobility. The peasants' families are estimated at 30,000. The Lutheran is the predominant religion of the province; even the Russo-Greeks

have not more than eight or ten churches in it. The superintendence of all ecclesiastical affairs in the Lutheran church is vested in the provincial consistory at Reval, and the number of parishes is 134. The department of education, which includes a gymnasium at Reval and about fifty other schools, with about 1500 pupils only, is under the control of the university of Dorpat. In 1831 the proportion of pupils to the whole population was not more than one in every 118 individuals.

The manufactures of Esthonia are extremely limited: the peasantry are clothed not only with linen but with coarse woollen cloth woven in their own houses. The only establishments of any importance are in Reval, where hats, leather, powder and starch, vinegar and some iron-ware are made. In 1830 indeed there were but three large manufactories in the whole province, and 297 workmen attached to them. Vessels are constructed in the capital and in the islands; and brandy is made on many estates as well as in the towns, and even by the farmers themselves, the distilleries of this spirit amount to nearly 400.

Reval is the emporium of trade, but for want of water communication it is not of any great extent. The exports consist of grain, brandy, salt-fish, skins and hides, butter, tallow, smoked herrings, and salmon and salt.

Though public affairs are administered on the same footing as in the other Russian governments, the country retains some vestiges of its antient constitution among which are a provincial college or council, an inferior tribunal of justice, a consistory, and the right of making brandy without a license from the government.

Esthonia is divided into four circles, viz. North-west, Reval or Revel, formerly Harrien, chief town Reval (13,000 inh.), with the island of Nargen (—0), Wrangel (600), Rokshaer, Malus Rumo, in the Roggs, and Odensholm; South-west, Hapsal, formerly Wiek, chief town Hapsal (1470), with the islands of Dagoe (10,000), Worm (1100), and Nukoe (— 0); South-east, Weissenstein, formerly Jerven, chief town Weissenstein (600); North-east, Wesenberg, chief town Wesenberg (1100), with the island of Eckholm, Heft, and Kumbilm, besides the districts of Kunda, chief town Kunda (400), and of Lad (— 24 inhabitants).

ESTIENNE. [Stephens.]

ESTOPPEL, an impediment or bar to a right of action arising from a man's own act, or the act of some person through whom he claims. There are three kinds of estoppel: 1. *By matter of record*, as letters patent, pleading, &c. Thus, in an action against a patentee by his assignee, the patentee is estopped from pleading that the patent is invalid.

2. *By matter of writing*, as by deed &c.: parties and privies are estopped from alleging any thing contrary to the deed. It is frequently laid down that an indenture is more effectual in working an estoppel than a deed poll [Deed]; but from the statement in the book from which this position is derived (*Shep. Touch.*, 53), it does not appear that the fact is so, inasmuch as it is there admitted that if both parties sign and seal a deed poll, they are equally estopped as if the deed had been indented.

3. *By matter in pais* (in the country), *i.e.*, transactions between the parties not evidenced by record or writing, as livery, entry, acceptance of rent, &c. Thus after acceptance of rent a landlord cannot treat his lessee as a trespasser. The rules which govern the application of this doctrine are laid down 1 *Inst.* 352 b.

ESTOVERS. Spelman in his Law Glossary says that this word is derived from the French *estoffer*, and that from *estoffer*, which is to supply with necessaries, and is of the same signification as the Saxon word *bote*. In legal phraseology it is the liberty which the owner of an estate for life, as well as a tenant for years (in the absence of any stipulation to the contrary), possesses of taking a reasonable and necessary supply of wood from the estate for the use or furniture of his house or farm, and this according to the use to which it was applied, was either called house-bote, plough-bote, cart-bote, or hedge-bote. *House-bote* is a sufficient allowance of wood to build or repair the house or to burn in it, which latter is also sometimes called *fire-bote*; *plough-bote* or *cart-bote* is the wood employed in the making or repairing all instruments of husbandry, as carts and ploughs, harrows, rakes, &c.; *hedge-bote* or *hay-bote* for repairing hedges, fences, pales, stiles, and gates, and to secure enclosures.

If a tenant takes more than is necessary for these purposes he may be punished for waste, as if he cuts down wood to burn when he has sufficient dead wood upon the estate, and a tenant, although he may cut down and take sufficient wood to repair pales and fences, he around them, still he cannot do so to make new ones.

A rector may also cut down timber for the repair of his parsonage house, or the chancel, or even for any old pews which belong to the rectory; and, like other tenants for life, he is entitled to estovers for repairing the barns and outhouses belonging to the parsonage.

Bracton uses the word estovers in a different sense, viz., as the sustenance, which a man committed for a felony is to have out of his lands and goods for himself and family during his imprisonment; it also occurs in the statute 6 Edw. I. c. 3, as an allowance of meat or cloth; but the more common and usual signification by which it is known to lawyers has been already stated. (Woodfall, *Landl. and Tenant*; Comyn.)

ESTRAY, any valuable tame animals found wandering at large within any manor or lordship, and whose owner is unknown. Having been impounded, and proclaimed in the church and the two nearest market-towns on a market-day, they become, if not claimed in a year and a day, the absolute property of the king, as lord paramount of the soil, though generally the lord of the manor or liberty is the special grantee of the crown. Animals upon which the law sets no value, as a dog or a cat, or such as are of a wild nature, as a fox or a wolf, cannot be taken as estrays. Swans may be taken as estrays, but no other fowl. The king or the lord does not acquire the absolute property in the estray until the full expiration of the year and a day which runs from the first proclamation, and not from the seizure; therefore if it escape before the time to another manor he cannot reclaim it.

The king or the lord is bound to take care of the estray, and find it in provision. He must not use it, but is liable to an action for so doing, though he may milk a cow or the like, for that tends to the preservation of the animal and is necessary. The owner on the other hand, if he claim within the time allowed, must pay the charges of finding, keeping, and proclaiming the estray.

It may be observed that if any person not being entitled to estrays finds and takes care of another's property, the owner may recover it or its value without being obliged to pay for the expenses incurred in keeping it.

ESTREAT, from the Latin word *extractum*, is a true copy or note on the rolls of a court of some original writing or record, especially of fines and amerciaments which are to be levied by a bailiff or other officer. In all cases of felony or misdemeanor where persons bound by recognizance either to appear themselves or for the attendance of any witnesses at trials of felonies or misdemeanors neglect to do so, the recognizance becomes forfeited; an officer of the court which sat at the end of the assize or session, prepares a list of the defaulters, and when the same has been approved by the judge presiding, the fine or forfeiture mentioned in the recognizance is said to be estreated, or certified into the Exchequer, and process is awarded for its recovery.

These fines when levied are paid into the Treasury, or the lords of the Treasury may, if they think fit, previously to the issuing of the process, stay the execution and remit the fine.

The barons of the Exchequer were also empowered by a standing writ of privy seal to discharge, mitigate, or compound forfeitures estreated into the Exchequer from other courts; and by the 4th Geo. III., cap. 10, they were also authorized, upon affidavit and petition, to discharge estreated recognizances and forfeitures except those incurred before justices of the peace. (*Term Report*; Burn, *Justice*.)

The various acts of parliament which now regulate the mode in which fines are to be levied upon estreated recognizances, &c., are the 4th Geo. IV., cap. 37, with regard to those before justices of the peace, the 7th Geo. IV., cap. 64, before judges of assize, recorders, &c., and the 3rd and 4th Wm. IV., cap. 99, which relates to such only as are forfeited in the Houses of Lords and Commons.

ESTRELLA. [Portugal.]

ESTREMADURA, a province of Spain, bounded on the north by the province of Salamanca, on the east by New Castile, on the south by Andalusia, and on the west by

Portugal. Its length from [illegible] is about 180 English miles, and its average [illegible] miles from east to west. Its area is reckoned at about 14,600 English square miles. Two large rivers, the Tagus and the Guadiana, both coming [illegible] across the province from east to west, and their [illegible] form the two natural divisions of the prov[illegible] Tagus being Northern Estremadura, called al[illegible] Estremadura, and that of the Guad[illegible] forming the [illegible] part, which is called Baja, or [illegible] Estremadura. A range of mountains, which is a conti[illegible] of the montañas de Toledo, in New Castile, and which, under the various names of Sierra de Guadelupe (5000 feet), Sierra Marchal, and Sierra de San Pedro, crosses Estremadura in a south-west and west direction, and then joins itself to the Sierra del Portalegre, on the frontiers of Portugal, forms the division between the waters which flow into the Guadiana and those which run into the Tagus. To the north the basin of the Tagus is bounded by another and still loftier ridge, the Sierra de Gredos, a continuation of the mountains of Avila, in Old Castile, which runs westward under the names of Sierra de Francia and Sierra da Gata, along the boundaries between Estremadura and Salamanca, and afterwards entering Portugal joins the Sierra d'Estrella in the neighbourhood of Alfaiates and Penamacor. From this northern ridge several considerable streams, such as the Alagon and the Tietar, flow southwards into the Tagus. The Alagon rises in the mountains of Las Batuecas, waters the fine plain of Plasencia, passes by Coria, and enters the Tagus above Alcantara. Its whole course is about 70 miles. Of the streams which enter the Tagus, on the opposite or southern bank, the principal one is the Salor, which rises in the Sierra de San Pedro, and enters the Tagus below Alcantara. The principal towns of the northern division of Estremadura are: Plasencia, a bishop's see, with 6760 inhabitants, and a fine aqueduct: it lies in the midst of one of the finest and best cultivated territories in all Estremadura: the convent of S. Justo, in which Charles V. ended his days, lies at the foot of the Sierra de Gredos, to the east of Plasencia: Caceres, south of the Tagus, with 10,000 inhabitants, the residence of the audiencia, or upper judicial court of the province: Alcantara on the Tagus, with 3300; its handsome bridge built by Trajan was partly destroyed during the Peninsular war: Valencia de Alcantara, near the frontiers of Portugal and at the foot of the Sierra Fria, with 4700 inhabitants: Truxillo, near the borders of Castile, the birth-place of the Pizarros, with 4600 inhabitants: Coria, north of the Tagus and west of Plasencia, with 2500.

The basin of the Guadiana, or southern division of Estremadura, is bounded to the south by a continuation of the Sierra Morena, which, under the name of Sierra de Guadalcanal and Sierra de Monasterio, divides the waters of the Guadiana from those of the Guadalquivir, running westwards along the borders of the provinces of Estremadura and Seville, and then entering that part of Alentejo which is east of the Guadiana. This branch of the Sierra Morena is comparatively low, few if any summits reaching 2000 feet above the sea. The banks of the Guadiana, especially below Badajoz, are low, flat, and unhealthy. The finest districts of this part of Estremadura are those of Llerena, near the foot of the Sierra Morena, of Xeres, and la Serena. Badajoz is the capital of all Estremadura, and the residence of the captain-general. [BADAJOZ.] The other towns of the southern division are: Merida, the antient Emerita Augusta, with about 5000 inhabitants, a handsome Roman [illegible] the Guadiana, restored by Philip II., a triumphal [illegible] remains of a theatre, of a naumachia, and circus, and numerous other traces of its former splendour; Xeres de los Caballeros, south of Badajoz, with 9300 inhabitants; Alburquerque, north of Badajoz, and near the frontiers of Portugal, with 6700 inhabitants; Olivenza, a fortified place formerly belonging to Portugal, with 2000 inhabitants; Llerena, near the foot of the Sierra Morena, with 6500; Zafra, an industrious place, with tanneries, and manufactures of hats, &c., 7500 inhabitants; Medellin, on the south bank of the Guadiana, the birth-place of Cortes, with 1700 inhabitants.

[illegible] whole population of Estremadura is vaguely reckoned at [illegible]50,000 inhabitants, divided among seven towns, 212 villas or boroughs, and 121 aldeas or villages, mostly thinly inhabited. The ecclesiastical division consists of three bishoprics, namely, Badajoz, Plasencia, and Coria, and 415 parishes. There were also 170 convents previous to the late suppression. Estremadura is one of the least populous provinces of Spain; its depopulation dates from the expulsion of the Moors, and the subsequent establishment of the Mesta, or administration of the flocks of migrating sheep which took possession of the vast tracts which had remained abandoned. About four millions of sheep come to graze, during winter, from the other provinces on the open spontaneous pastures of Estremadura. Other tracts are covered with underwood and wild odoriferous herbs. There are also forests of oak, beech, chestnut, and pine trees, where numerous herds of swine feed: the flesh of these animals forms a considerable article of commerce with other provinces of Spain. Game of every sort is plentiful. The cultivated parts produce some wheat, oats, Indian corn, flax, hemp, and the vine, olive, mulberry, and lemon trees. Excellent honey and wax are also gathered. Many ruined and deserted villages are met with over the country, with traces of former cultivation and of a population which has disappeared.

The Estremeños, or inhabitants of Estremadura, are reckoned the most grave and taciturn of all the people of Spain. Living in a remote inland province, with few means of communication with the rest of the world, they have, generally speaking, no notion of the luxuries or even comforts of other countries, and therefore do not exert themselves to acquire them. When they have an object in view, they are capable of great exertion and perseverance: they are frank, sincere, and honourable, and robust of body, and disposed to military service, especially in the cavalry. Some of the boldest adventurers who discovered and conquered America were natives of Estremadura. The great number of emigrants who left this province for the New World during the sixteenth century has been considered, but with little reason, as one of the causes of the depopulation of the country. The name of Estremadura is said to be derived from the Latin 'extrema ora,' it being the furthest and latest conquest of Alonso IX. over the Moors in 1228.

The high post-road from Madrid to Lisbon crosses Estremadura, and is kept in good repair. The other roads are bad, and impassable for carriages in the rainy season. The posadas or inns on the roads are among the worst in Spain; provisions are scarce, and the markets few and ill supplied. On the side of Portugal, the frontier north of the Tagus between Estremadura and Beira is marked by a ridge of hills, an offset of the Sierra de Gata, which extends from Penamacor, a town within the Portuguese frontier, southwards to the Tagus, a few miles west of the bridge of Alcantara. A road leads from Plasencia across these hills by Zarza and Zibreira to Castello Branco in Portugal. South of the Tagus, the western boundary of Estremadura is much further advanced towards the west; beginning near Montalvaõ, about 35 miles west of Alcantara, it continues southwards, passing a little to the east of Castello de Vide and Campo Mayor, which are in Alentejo, down to the Guadiana, a few miles below Badajoz. From thence, for about 30 miles southwards, the Guadiana serves as a boundary, after which an ill-defined tortuous line, of about 50 miles more, first south and then south-east, marks the limits between Estremadura and Alentejo, to the foot of the Sierra Morena, which forms the north boundary of Andalusia.

Estremadura has mines of copper, lead, and iron; and one of silver at Lagrosan, near Alcocer. The manufactures are few, consisting chiefly of leather and hats at Badajoz, Zafra, and Caceres. The annual net income derived from the land belonging to lay proprietors is estimated by Miñano at 55 millions of reales vellon, or little more than half a million sterling, and that belonging to the clergy both regular and secular, before the late suppression, at 21 millions and a half, or about 210,000*l.* sterling. (Miñano, *Diccionario Geografico*, article 'Estremadura;' and also 'Statistical Tables' annexed to the art. 'España;' Ancillon: Bowles.)

ESTREMADURA, a province of Portugal, is bounded on the north by Beira, on the east partly by Beira and partly by Alentejo, on the south by Alentejo, and on the west by the Atlantic Ocean. The length of the province from north to south, from the village of Lavaos, which lies on the sea-coast south of the mouth of the Mondego, to the borders of Alentejo near Melides, south of the lagoon of Setubal, is about 140 miles, and its greatest breadth from east to west is about 85 miles. The ridge of the Estrella, which crosses part of Beira from east

to west, sends off a branch to the south-west, which enters Estremadura west of Pombal, and runs obliquely through the length of the province under the various names of Serra de Louzaõ, Serra de Alberdos, Monte Junto, and Serra de Baragueda. The Serra de Baragueda stretches to near Torres Vedras, and there meets at an oblique angle the ridge which spreads from east to west from the Tagus to the sea across the peninsula in which Lisbon is situated. This latter ridge, which is separated from the former by a narrow but deep ravine extending from Torres Vedras towards Sobral, furnished Lord Wellington in 1810 with a valuable position of defence against the French invading army under Marshal Massena. The line of hills extends from the mouth of the Zizandre, west of Torres Vedras, to the town of Alhandra on the Tagus, a distance of about thirty miles. The village of Sobral lies in front of the centre of the line.

The central ridge or continuation of the Estrella chain already mentioned divides the waters which flow into the Tagus from those streams which run direct into the ocean. Among the tributaries to the Tagus, the most considerable are—1 The Zezere, a rapid stream which has its source in the mountains of Guarda in Upper Beira, enters Estremadura near Pedrogaõ, and running southwards receives the Narvaõ from Thomar, and then enters the Tagus at Punhete below Abrantes. 2. The Azembuja, called also Rio Mayor, which rises north of the town of Rio Mayor, and flows in a tortuous course, passing near Cartaxo, and at the foot of the hill of Santarem, and enters the Tagus above Villa Franca. The streams which flow from the north-west slope of the ridge into the ocean are—1. The Lis, which rises near Alcanhede, flows by Batalha, receives the Lena near Leiria, and enters the sea south of Cape Paredes. 2. The Alcoa, which rises south of the Lis, is joined by the Baça (the two together giving the name to the town of Alcobaça), and after a short course enters the sea. 3. The Arnoya, a small stream which rises in the group of Monte Junto, passes by Obidos and Rolixa, where the first engagement between the English and the French in the Peninsula took place on the 17th of August, 1808, and then enters the lake or lagoon of Obidos which communicates with the sea. 4 Farther south towards Torres Vedras is the river Marceira, which passes by Vimieiro, and after a short course enters the sea south of Peniche Point. 5. The stream Zizandre rises below Sobral, flows through the ravine above mentioned between the Serra de Baragueda and the ridge of Torres Vedras, and enters the sea at the west extremity of the lines.

That part of Estremadura which lies north-west of the central ridge and between it and the sea is mostly flat and sandy towards the coast, and either barren or covered with forests of pines. Leiria lies in a fine valley on the Lis, at the foot of the hills which are covered with olive plantations. The country which lies to the south-east of the ridge sloping towards the Tagus is finer and better cultivated, especially the plains about Thomar and Santarem, which are very fertile, and abound with olive and other fruit-trees, and fine pasture grounds. The country about Cartaxo produces much wine. But the finest part of the whole province is that which lies to the south of the lines of Torres Vedras towards Lisbon. A second range of hills rises behind the first, extending from Mafra and Ericeira on the sea, to near Povoa on the Tagus, the high summit called Cabeça de Montachique standing in the centre; and south of these are the hills of Cintra, Queluz, Bellas, &c., which command the city of Lisbon and the banks of the Tagus down to Fort St. Julian. Between these various ranges are delightful valleys, covered with villages, convents, and quintas or country seats, and with gardens, orchards, and vineyards, remarkably well cultivated. This pleasing exception to the generally slovenly state of agriculture over the greater part of Portugal was attributed, in the last century, and by authorities not liable to a suspicion of partiality, to the example of the English residents at Lisbon, who being partial to rural life, took pains to embellish their country-houses and gardens according to the fashion of their native country, and thus inspired the Portuguese with a taste for imitating them by availing themselves of the abundant resources which a fine soil, a favourable site, and a genial clime afford. (Du Chatelet and Bourgoing, *Voyages en Portugal*.) The vineyards of Bucellas, Carcavellas, and Collares, produce excellent wine. The neighbourhoods of Mafra, Cintra, Cascaes, Queluz, Caneças, are justly celebrated for their romantic position. A pleasing sketch of these delightful spots is given in Baillie's *Recollections of Portugal*, 1835.

The south-eastern part of Estremadura, which lies on the left or south bank of the Tagus, is not so fine as that on the right bank, being mostly sandy, and unhealthy in several places. A range of hills which is a continuation of the Serra de Portel in Alentejo, which is itself joined to the mountains of Spanish Estremadura, runs from east to west at a short distance south of the Tagus, enters Portuguese Estremadura north of Setubal, and terminates on the peninsula of Almada opposite to Lisbon. But the limits between Estremadura and Alentejo are not marked by this range, the line of demarcation being a tortuous and capricious one, beginning from the sea north of Cape Sines, then taking a semicircular sweep to the eastward, crossing the river Sadaõ and the range above mentioned east of Alcacer do Sal, and then turning northwards and following the course of the river Canha to the Tagus. The country inclosed within this line, the sea and the Tagus, forms the comarca or district of Setubal which is included in the province of Estremadura. But farther to the east Estremadura again encroaches upon Alentejo, extending along the left bank of the Tagus from Salvaterra up to Perales, which lies nearly opposite Abrantes and the hills called Cimes de Ourem: the limits between Estremadura and Alentejo are marked on this side by the course of the rivers Soro and Zatas, the latter of which falls into the Tagus. This part of Estremadura contains the territories of Chamusca, Almeirim, and Salvaterra, which are included in the administrative districts of Santarem and Alemquer beyond the Tagus. According to a new territorial division planned by the Cortes of 1822, the Tagus was to form the southern boundary of Estremadura, the whole left bank being considered as belonging to Alentejo. But the political convulsions that followed prevented the new plan from being put into execution.

Estremadura is divided into the following comarcas or districts:—1. Lisbon, which includes the capital and its suburbs; Belem, with its splendid monastery; Bemfica, near the fine aqueduct of Agoas Livres, which carries the water to Lisbon; Campo Grande, with an important manufactory of silks; Bellas, with 3400 inhabitants; Oeiras on the Tagus below Belem, once the residence of the marquis de Pombal. The population of the comarca of Lisbon is estimated at 360,000. 2. Torres Vedras, with the town of that name, 3400 inhabitants; and also Mafra, with 3000, and its splendid palace, church, and convent, called the Escurial of Portugal, and a vast royal park; Ericeira, near Mafra, a small fishing harbour; and the port of Cascaes, near the entrance of the Tagus. 3. Villa Franca, with the pretty town of that name on the Tagus above Lisbon, with 4000 inhabitants; and Alhandra, with 2000, a manufactory of lime, and brick kilns, which supply Lisbon with bricks. 4. Alemquer, with the town of that name, 2600 inhabitants, and a paper manufactory; and the town of Chamusca beyond the Tagus, with 3000. 5. Santarem: the town of that name stands on a steep hill rising above the Tagus, with several massive convents and other extensive buildings, and an old castle, and 7300 inhabitants. The other towns of this district are: Torres Novas, a lively place in a fine country, with about 4000 inhabitants; Golegaõ on the Tagus, where one of the principal fairs of Portugal is held; Salvaterra de Magos, on the left bank of the river, with a royal villa and hunting park, which contains wild boars. 6. Thomar, containing the town of Thomar, east of Santarem, with 4000 inhabitants, a large manufactory for spinning cotton, manufactories of hats and printed stuffs, and a vast convent belonging to the military order of Christ. The other towns are: Abrantes, on the slope of a hill above the Tagus, with 5000 inhabitants, the fine church of St. Vincent, and a bridge of boats over the Tagus. The navigation of the river does not extend much above Abrantes, which is about 90 miles above Lisbon by the course of the river. Punhete, at the confluence of the Zezere with the Tagus, Sardoal, with 3000 inhabitants, and Pedrogaõ, at the foot of the Estrella, belong also to the district of Thomar. 7. Ourem, north-west of Thomar; the town of that name has 3000 inhabitants. 8. Leiria, containing the town of the same name, with 2000 inhabitants, with a bishop's see and a castle, on a steep hill. Near it is the village of Marinhagrande, with a glass manufactory, established by an English speculator. The other towns of this district are: Pombal, near the

ders of Beira, with 4000 inhabitants. Batalha, near Leiria, with its splendid convent and church, one of the finest specimens of Norman-Gothic architecture, it was built by King John I. after the victory which he gained over the Spaniards at Aljubarrota, in the neighbourhood. The church contains the tombs of the kings of Portugal. 9. Alcobaça, containing the town of Alcobaça, south-west of Leiria, with about 1500 inhabitants and a magnificent convent. The harbour of Peniche, who is near Alcobaça, and further south is the strong castle of Peniche, on a promontory facing the Berlengas Islands. 10. The district of Setubal. The town of that name, often by corruption called St. Ubes, is at the mouth of the river Sadaõ, has a good harbour and 15,000 inhabitants, and exports large quantities of salt, which is made from sea-water in the neighbourhood, and also wine and fruits, especially oranges. It is, next to Lisbon and Oporto, the most commercial place in the kingdom. The river Sadaõ rises in the Serra de Monchique, on the borders of Algarves, and is navigable for about 30 miles above Setubal. The other towns of this district are Almada, opposite to Lisbon, with 4000 inhabitants. Aldea Gallega, higher up the river, which is the common landing place from Lisbon to the southern provinces, it has about 4000 inhabitants, chiefly boatmen and fishermen. Cezimbra, west of Setubal, near Cape Espichel, with a small harbour and 4000 inhabitants, chiefly fishermen. Alcacer do Sal and Azeitaõ are small towns in the interior.

The whole population of Estremadura is reckoned by Miñano at 800 000 inhabitants. Its area has been variously stated, according to Antillon and Miñano it is 7?0 square Spanish leagues of 20 to a lineal degree of latitude. The climate is generally healthy being free from the excessive heats of Alentejo and from the cold winters of Beira. The westerly winds, which find an opening along the wide valley of the Tagus, refresh the air. The rivers, as well as the sea coast, abound with fish. The principal products of the country are wine, oil, maize, fruits of every sort, and cattle. Wheat and oats are rather scarce, but Lisbon imports corn and flour from other countries.

ESTREMOS, one of the strongest fortresses in Portugal, agreeably situated on the Tarra in Alentejo. It consists of the upper and the lower towns, the former with the citadel standing on an eminence, the latter in the valley below. Population 6500. Here Schomberg gained a victory over the Spaniards in 1663, 38° 46′ N. lat., 7° 23′ W. long.

ESTUARY. [ÆSTUARY.]

ETÆ'RIO is a kind of fruit consisting of achenia, or small closed up seed-like seed vessels placed upon a succulent receptacle. The strawberry and the raspberry are of this nature, and are very incorrectly called *berries*, in the botanical sense of the word berry. [BACCA.]

ÉTAMPES, a town in France, in the department of Seine and Oise, on the road from Paris to Orléans, 28 miles in a direct line south by west of Paris, or 31 miles by the road. Etampes is on the bank of two little streams that unite just below the town with the river Juine (or as it is sometimes called, the river Etampes), which flows into the Essone, a feeder of the Seine.

In the year 911 Etampes was burnt by the Northmen or Normans under Rollo. In the latter part of the same century, or the beginning of the next, Constance, wife of Robert, King of France, built here a castle and Robert himself converted the Oratory of the castle into a collegiate church. The castle was held for the king in the eleventh and twelfth centuries by officers who had the titles of Prévôt, [illegible], or Vicomte. There was a Jews' synagogue at Etampes, which upon the expulsion of that people from France by Philippe Auguste, A.D. 1182, was converted into a church, that of Notre Dame, yet standing. In the fourteenth century Etampes which had previously been a royal domain, was given by Philippe le Bel to his brother Louis Count of Evreux. It afterwards came successively into the hands of the Dukes of Berri, Bourgogne, Bretagne, and again of Bourgogne. In the sixteenth century Etampes, with its territory or county was erected into a duchy in favour of Jean de Brosses, whose wife was mistress of François I. In the religious wars of France, A.D. 1562, the town was taken by the Germans brought into France by the Prince of Condé. In A.D. 1567 it was taken by assault by the Huguenots; in A.D. 1589 it was the rendezvous of the troops of the League, from whom it was taken by Henri III. In A.D. 1590 it was taken from the party of the League, into whose hands it had again fallen, by Henri IV., who caused the fortifications of the castle to be razed. The town suffered much from the exactions of the contending parties in the civil war of the Fronde.

The town is in a tolerably fertile valley, and consists principally of one street. The tower of Guinette is the only remain of the antient castle. There are at present four churches. That of Notre Dame has a lofty tower and spire, the semicircular arch may be observed in it. The church of St. Giles is also very antient, it has the semicircular arch, with zig zag mouldings. There are in the town several houses built about the time of the revival of the arts, especially that of the Duchess of Etampes, mistress of François I. The town hall is an antient turreted building. There is a large public granary erected recently. Etampes is surrounded by promenades planted with trees. Near the town is an antient building, probably of Roman origin, but popularly called 'the tower of Brunehaut.' A modern castle has been erected upon these ruins.

The population of Etampes in 1832 was 8109. They manufacture soap, leather, woollen yarn, cotton counterpanes, and hosiery, and trade in wool, corn, flour, and honey. There are more than forty mills of different kinds on the two brooks which water Etampes. Sandstone is quarried in the neighbourhood, and much garden stuff raised for the supply of Paris. Etampes is the capital of an arrondissement (which had in 1832 a population of 41,208), and has a subordinate court of justice (tribunal de première instance), a high school, and an agricultural society. Guittard and Geoffroy de St. Hilaire were natives of this town.

ETAWEH, a district in the province of Agra, bounded on the north by Furruckabad and Alighur, on the east by the kingdom of Oude, on the south by Cawnpore, and on the west by the district of Agra. The district of Etaweh forms part of the Doab and was acquired by the English from the king of Oude in 1801. The principal towns are Etaweh the antient capital and Minpooree, the modern capital, Kanoje, Belah, and Shekoabad. The town of Etaweh stands on the east bank of the Jumna, in 26° 47′ N. lat. and 78° 53′ E. long., about 70 miles south-east from Agra. Minpooree is a large town on the banks of the Issa, in 27° 14′ N. lat. and 78° 54′ E. long., about 62 miles east from Agra. It stands in a fertile country, and is a populous place. Kanoje stands on the west side of the Ganges, in 2?° ?4′ N. lat. and 79° 47′ E. long., about 6? miles west north west from Lucknow. This is a very antient place, it was formerly of considerable extent, and at the period of the Mohammedan invasion was the capital of a powerful empire but at present consists of only one street. It is two miles distant from the Ganges, but is connected with that river by means of a canal. Belah is about 21 miles south south-west from Kanoje, in 26° 49′ N. lat. and 79° 27′ E. long. Shekoabad is situated in 27° 6′ N. lat. and 78° 27′ E. long., about 37 miles east-south-east from the city of Agra. The soil, productions, and climate of this district have already been described. [AGRA; DOAB.]

ETCHING. [ENGRAVING.]

ETHAL. [EDFU.]

ETHAL, a substance separated from spermaceti by Chevreul. It is a solid, fusible at nearly the same point as spermaceti, and on cooling crystallizes in plates. It is insoluble in water, but in alcohol at 150° Fahr. is much more soluble than spermaceti. It is susceptible of union with various bases, with which it forms salts or soaps.

ETHELBALD, king of Wessex, was the eldest surviving son of Ethelwulf, who resigned to him the throne of that state in 855 or 856. [ETHELWULF.] On the death of Ethelwulf in 857 or 858 Ethelbald married his young step-mother Judith of France, but the vehement remonstrances of Swithin, bishop of Winchester, prevailed upon him, after some time, to abandon the incestuous connexion. Judith afterwards became the wife of Baldwin, count of Flanders, and the ancestress of Matilda, the wife of William the Conqueror, and, through her, of all the succeeding kings of England. The chroniclers speak in very favourable terms of the subsequent conduct of Ethelbald, but although he had greatly distinguished himself in the wars with the Danes in his father's time, his own reign is not marked by any military events. He died in 860, and was succeeded by his next brother, Ethelbert.

ETHELBERT, or, as the name is written by Bede,

ETHELBERT, was the fourth king of Kent in lineal descent from Hengist, through Eric or Aesc, Octa or Ochta, and Ermenric, whom he succeeded while yet a child in the year 560. As the representative of the first leader of the Anglo Saxons and the founder of the oldest kingdom of the Heptarchy Ethelbert, as soon as he attained manhood engaged in a contest for the title of Bretwalda with Ceawlin king of Wessex, who claimed that supreme dignity as the grandson of Cerdic [ENGLAND]. He invaded Wessex in 568, but the war was speedily ended by his defeat in a great battle fought at Wibbandune, now Wimbledon, in Surrey. This was the first instance of one of the states of the Heptarchy drawing the sword against another. Ethelbert, however, according to Bede, came to be acknowledged as bretwalda about the year 593, after the decline of the fortunes of Ceawlin who was deposed about this time by his subjects and ended his days a few years after. Ethelbert retained the supremacy during all the remainder of his reign, though it would seem that his title never was acknowledged by the kings of Northumbria.

The most memorable event in the reign of Ethelbert was his conversion to Christianity and the establishment of that religion in his dominions by the ministration of St. Augustine [AUGUSTINE, ST.]. Ethelbert professed himself a Christian and was baptized on the feast of Pentecost A.D. 597. The Christian worship however must have been familiar to him long before this time, for he had been married to a Christian wife, Bertha, the daughter of Charibert, king of Paris, in the year 570, and she and her attendants had ever since practised their own faith under the guidance of Luidhard, a bishop who had accompanied her from France. After his conversion Ethelbert exerted himself with zeal in the diffusion of his new faith. He founded the bishopric of Rochester about the year 604 in his own dominions, in addition to the archbishopric of Canterbury, the establishment of which is dated from the arrival of Augustine. To him also must be principally attributed the foundation, about the same time with that of Rochester, of the bishopric of London in the state of Essex, which was at this time governed in subordination to Kent by Sebert, Sebercht, Sabert, Saebryht, or Saba, a nephew of Ethelbert. Bede says that the cathedral of London, which was dedicated, like the others that have since been built on the same site, to St. Paul, was erected at the joint expense of Ethelbert and Sebert. The conversion of the king and people of Essex had previously been effected through the influence of the king of Kent. It was also through his daughter Edilberga, who married Edwin, king of Northumbria, that Christianity was introduced into that state. [EDWIN.]

Ethelbert deserves especial remembrance in English history on another account. He is the author of the earliest of our written laws, the collection of 'Dooms,' as Bede calls them, 'which he established with the consent of his witan in the days of St. Augustine.' They are written in Saxon, or English as it is termed by Bede, although all the other Teutonic nations employed the Latin language in their codes, and they are the earliest laws that exist in any barbarous or modern tongue. There is no reason however to suppose that the regulations which they established were in general new. They relate, to quote the words of Sir F. Palgrave (*Eng. Com.* p. 44), 'only to the amount of the pecuniary fines payable for various transgressions, the offences against the church being first enumerated. These were of new introduction, but every other mulct was known before; and it is probable that the principal benefit of the law consisted in a fairer apportionment of the compensation to the crime than could be obtained according to the older customs.' The collection consists altogether of eighty-nine enactments or clauses, at least as it has come down to modern times. But the only copy of it which we possess is that contained in the volume called the 'Textus Roffensis,' which was compiled by Ernulphus, bishop of Rochester, in the early part of the twelfth century; and 'it is difficult to believe,' as Sir F. Palgrave has observed, 'that the text of an Anglo-Norman manuscript of the twelfth century exhibits an unaltered specimen of the Anglo-Saxon of the reign of Ethelbert. The language has evidently been modernized and corrupted by successive transcriptions. Some passages are quite unintelligible. Neither is there any proof whatever of the integrity of the text. It cannot be asserted with any degree of confidence that we have the whole of the law. Destitute of any statutory clause of enactment, it is from the title or rubric alone that we learn the name of the legislator.' The next oldest Anglo-Saxon laws that have been preserved (those of Hlothaire and Eadric, also kings of Kent) are more than a century and a half later than Ethelbert.

Ethelbert died in 616. He appears in his old age to have married a second wife, whose name has not been recorded. All that we know of her is that after the death of Ethelbert, her youth and beauty were sufficient to tempt his son and successor Eadbald, to take her to his bed, and of course to renounce at the same time the profession of Christianity. After a short time however Eadbald dismissed his stepmother, and returned to the faith he had abandoned, of which he ever after continued a firm supporter. The dignity of Bretwalda went on the death of Ethelbert, to Redwald, king of the East Angles.

ETHELBERT, king of Wessex, was the second surviving son of Ethelwulf, by whom he was made king of the subordinate state composed of Kent, Essex, Sussex, and Surrey in 852, on the death of Athelstan [ETHELWULF.] On the death of his elder brother Ethelbald, in 860, although excluded by his father's will from the succession to the supreme crown of Wessex, he was preferred by the Witan to his younger brother Ethelred, who claimed under the will. The chronicles celebrate the courage and military talents of Ethelbert, but no events of his short reign are distinctly recorded. It appears however that the Northmen continued to make occasional descents both on the coasts of Wessex and on those of other parts of the island. All that we are told of Ethelbert is, that he died in 865 or 866. He appears to have left a son, Ethelwald, and other children, but he was succeeded on the throne of Wessex by his younger brother Ethelred.

ETHELRED I. (called also Edelred and Ethered), king of Wessex and head of the Heptarchy, was the third surviving son of King Ethelwulf, who in his will (ratified by the Witan) appointed Ethelred to succeed to the throne immediately after his eldest brother Ethelbald; he did not however succeed till after the death of his elder brother Ethelbert in 866. (ETHELWULF and ETHELBERT of Wessex.) The reign of Ethelred was one of the deepest gloom both for Wessex and for the other states of England. In the last year of the preceding king, the great Danish chief Ragnar Lodbrog, had been taken prisoner while making an attack on Northumbria, and put to death with cruel tortures. It appears to have been with the purpose of avenging this loss that the various Scandinavian nations immediately united their strength in that great expedition against England which terminated in the conquest of half the country. The invaders, to the number of several thousands, under the command of Inguar (or Ivar) and Ubbo (or Hubba) landed on the coast of East Anglia, immediately after the accession of Ethelred to the throne of Wessex. Having encamped and passed the winter on shore, they marched into Yorkshire in the spring of 867, took possession (1st March) of the city of York, and having there (12th April) repulsed with great slaughter an attack of the Northumbrians under Osbert and Ella, made themselves masters of all the kingdom of Northumbria to the south of the Tyne, and placed Inguar over it as king. They then marched into the kingdom of Mercia, and passed the winter of 867-8 in the town of Nottingham. Beorhred, the Mercian king, now solicited the aid of Ethelred, and the king of Wessex, accompanied by his younger brother Alfred, whom he appears to have admitted to a share of the royal power, advanced with an army against the foreigner. The Danes however did not venture to engage the allied forces of Wessex and Mercia, and a treaty was made by which they agreed to evacuate Nottingham and to retire to York. In that city they remained quiet for the remainder of this year, and all the next, during which England was afflicted by a severe famine, followed by a terrible mortality both of human beings and cattle. But, in the spring of 870, disregarding the late pacification, they resumed hostilities, carrying their arms across the Humber into Lincolnshire, which was included in the dominions of Mercia. Notwithstanding some attempts to check their progress, which were made by Earl Algar, the governor of the district, they speedily overran all Lincoln and pushed their way into the adjoining territory of East Anglia, sacking and destroying in their course the abbeys of Croyland and Medehamstead (or Peterborough), the town of Huntingdon, and the nunnery of Ely, and massacring and laying waste wherever they appeared

with unheard of ferocity. At a village called Hoxton, in Norfolk, they seized Edmund, the East Anglian king, and put him to death. He sustained the torments they inflicted upon him with such constancy that he was afterwards revered as a martyr, and the 20th November, the day on which he met his fate, was assigned to him in the calendar. His death made the Danes masters of East Anglia, over which they placed Godrun, one of their chiefs, as king. They now resolved to invade Wessex, the only state which they had not either conquered or rendered powerless. They entered Berkshire under the command of Halden and Bacseg, and took the town of Reading without encountering any resistance, but they were soon after attacked by Earl Ethelwulf at the neighbouring village of Englefield, and driven from their ground with the loss of Sidrac, one of their most renowned captains. Four days after they were fallen upon at Reading by King Ethelred and his brother Alfred, but on this occasion the Saxons were repulsed with great loss, the brave Earl Ethelwulf being among the slain. The battle of Reading, however, was followed in four days more by another more important encounter at a place which the old writers call Aescesdun, or the Ash-tree Hill, and which has been supposed by some to be Aylesbury in the west, by others Ashton in the east of Berkshire. The Danes were here attacked with great impetuosity and valour by Alfred, and, notwithstanding their advantageous position, were, after a struggle of some length, completely defeated and put to flight. It is said that the English chased them for the whole of the night and next day over the country till they reached the town of Reading, in which they again shut themselves up. But a fortnight after the battle of Ash-tree Hill they again met the two kings of Wessex at Basing, in the north of Hampshire, and this time the English were worsted. A similar result attended the next battle, fought about two months after at a place called Merton, which has been variously conjectured to be Merton in Surrey, Merton in Oxfordshire, Morden in Wiltshire, and Martin in Berkshire. In this engagement, which must have taken place early in 871, Ethelred received a wound, of which he died soon after Easter, leaving the new dominions in the inheritance of the crown of Wessex, and what would at a later period have been called the suzerainty of England, to his younger brother Alfred.

ETHELRED II., surnamed the Unready, king of the Anglo-Saxons, was the youngest son of King Edgar, by his second wife, the infamous Elfrida. On the murder by Elfrida of his elder brother Edward the Martyr, in 978, he was reluctantly acknowledged as king by the Witan, in the absence of any other individual having a pretension to the crown; even Dunstan, who had steadily opposed the party of Elfrida throughout the late reign, finding himself now obliged to acquiesce in the accession of her son. He was crowned by Dunstan, at Kingston on the Thames, on the 14th of April, being at this time only about ten years old. The reign of Ethelred the Unready is one of the most calamitous and disgraceful in English history. The feeble and distracted government that arose out of his minority and the circumstances of his accession immediately drew once more upon England the attention of the northern piratical powers, who had now remitted their attacks for nearly a century. A small body of Danes landed at Southampton in 980, and scarcely a year passed afterwards in which one part or other of the country was not in like manner visited and ravaged, usually with impunity. At length, in 991, a much larger force than had before appeared arrived under two leaders named Justin and Guthmund, and after taking the town of Ipswich, proceeded to Maldon and there encountering the English army commanded by the alderman Brithnod, obtained a complete victory, Brithnod himself being slain. On this it was resolved by the English Witan on the advice, it is said, of Siric, who had succeeded Dunstan as the king's chief counsellor, to buy off the invaders with a sum of money. They agreed to accept 10,000 pounds of silver, which was accordingly paid to them, being raised by an impost on all the landed property in the kingdom, which from this time became a regular tax, under the name of the Danegeld, and was perhaps the first direct tax imposed in England. It was felt however that this was a very precarious expedient to trust to, and, as soon as the Danes were gone, the government proceeded to fit out a formidable fleet, which might perhaps have been of service if it had been ready to meet them when they arrived. As it was, it was no sooner afloat than it was rendered useless by treachery and mismanagement. A squadron of Danes having again appeared on the coast in 992, Alfric, the commander of the English fleet, when sent to surprise them, secretly gave them information of the intended attack, and then went over and joined them. The next year, when the Northmen made a descent upon the coast of Northumberland and took by storm the castle of Bamborough, the leaders of the force sent against them in like manner deserted to the enemy. In 994 a much more powerful armament than had yet appeared sailed up the Thames under the command of Sweyn or Svein, king of Denmark, and Olave, king of Norway. It consisted of ninety-four ships, and directed its first efforts against London, which however defended itself successfully against the assault. The invaders then overran and laid waste a great part of Essex, Kent, Sussex, and Hampshire. In the end they were again bought off by the payment of a sum of money, their demand this time rising to 16,000 pounds of silver. Olave now consented to embrace Christianity, and he faithfully kept his promise of never again molesting England. [illegible] the king of Denmark, his forces continued their [illegible] year after year, and at last, in 1001, Ethelred [illegible] [illegible] once more compelled to rid himself of them [illegible] [illegible] by his old expedient. He was now obliged to [illegible] them 24,000 pounds of silver.

[illegible] [illegible] the relief which he thus purchased [illegible] [illegible] it is impossible to say. [illegible] [illegible] [illegible] mode of dealing with the enemy which was of a very different character from that to which he had hitherto [illegible] combined the qualities of being [illegible] still more unjustifiable and still less likely to prove efficient. On the 13th November, the festival of St Brice, in the year 1002, the English inhabitants in [illegible] [illegible] it is said, to secret instructions received in every [illegible] from the government the evening before, [illegible] in all parts of the kingdom upon the Danes who were [illegible] [illegible] among them, and put them to death, men, women, and children. There has been some dispute as to the [illegible] [illegible] which this massacre was carried and its [illegible] [illegible] [illegible] have comprehended all the persons of Danish [illegible] [illegible] in the country [illegible] [illegible] [illegible] certain that the majority of the inhabitants [illegible] of this description; but there can be no doubt that a very large number of persons perished. This atrocious and [illegible] was unwise proceeding did not long remain without its punishment. The next year Sweyn, whose sister is said to have been among the butchered, again appeared on the south coast, and from this time it may be said the kingdom had no rest. After the devastations of the invaders had been continued for four years, they were once more bought off in 1007 by a payment of 36,000 pounds of silver. The next year by extraordinary efforts a numerous fleet was built and assembled at Sandwich, but a dispute arising among the captains, one of them deserted with twenty vessels and turned pirate, and nearly all the rest were soon after destroyed by a tempest. Meanwhile all the other forms of public calamity combined to afflict the nation. The king was an object of general hatred or contempt; the nobility were divided into hostile factions [illegible] [illegible] and contagious diseases vied with the swords of the invaders in destroying the miserable people. In 1009 a new Danish force arrived under a leader named Thurchil, who for the three following years spread devastation throughout the only part of the country that had hitherto afforded an asylum from the foreigner, that of East Anglia. At last, after he had sacked and burned the city of Canterbury, he was bought off in 1012 by a payment of [illegible] pounds of silver, and he and his followers agreed, on being allowed to settle in the country, to become the subjects of the English king. But the next year Sweyn himself again made his appearance, now avowing his determination not to depart till he had effected the conquest of the country. Entering the Humber, he received the submission both of the Northumbrians and of the people of Lincoln that were in like manner chiefly inhabited by a population of Danish descent. He then marched across the country to London, putting all the males to the sword as he advanced; but the capital, which was defended by Ethelred and Thurchil, resisting his assault, he turned to the west, and, compelling the nobles to make their submission to him wherever he passed, he proceeded to Bath, and there caused himself to be proclaimed king of England. Soon after this London submitted to his authority, and in

the middle of January, 1014, Ethelred fled to the court of Richard duke of Normandy, whose sister Emma he had married some years before. He had previously sent thither Emma and her two children.

On the 2nd of February however Sweyn died. His son Canute was immediately proclaimed king by the army; but the English determined to recall Ethelred. He was brought back accordingly, after entering into a solemn agreement with the Witan, that he would be a good lord to them, and amend all they wished to have amended, and that all things should be forgiven which had been done or said against him, they on their parts promising that they would all turn to him without fraud, and would never again permit the Danes to have dominion in England. Canute deemed it prudent to take flight before the national enthusiasm of the moment: and it is said that another general massacre of the Danes that were left behind in the country signalized the restoration of a national government. But Canute returned the following year with a powerful fleet: he was immediately joined by Thurchil, who, till now, had remained faithful to his English allegiance; other chiefs followed Thurchil's example, and a great part of the country appears to have again speedily submitted to the Danes. Ethelred was confined to his bed by illness when Canute arrived, and he died in London on the 23rd of April, 1016, at the moment when the enemy was preparing to attack that city. He was succeeded by Edmund, surnamed Ironside, his eldest son by a lady named Elfleda, who is said to have borne him six sons and four daughters, but to whom it is doubtful if he was ever married. Edward, one of his two sons by Emma of Normandy, whom he married in 1002, also afterwards ascended the throne. [EDMUND IRONSIDE, and EDWARD THE CONFESSOR.]

ETHELWULF was the son of Egbert the Great, whom he succeeded in the throne of Wessex and the supremacy over the other states of the Heptarchy, in 836. The provinces of Kent, Essex, and Sussex, which Egbert had conquered and annexed to his dominions, and also that of Surrey, which had hitherto been included in Wessex, were at the same time formed into a separate but subordinate kingdom, and put under the government of Athelstane, whom some of the chroniclers state to have been the eldest son, others a younger brother of Ethelwulf. There is no older authority than that of Malmesbury (whose account is indisputably incorrect in several particulars and improbable in others) for the story that Ethelwulf was a monk at the time of his father's death. His early education is recorded to have been conducted first by Helmstan, bishop of Winchester, and afterwards by Swithin, whom, on coming to the throne, he advanced to the same see; and he had also served with distinction in the field in the lifetime of his father. When he succeeded to the crown he retained as his chief counsellor the able Alstan, bishop of Sherborne, who had been in great favour with Egbert. What has been preserved of the history of the first fourteen or fifteen years of the reign of Ethelwulf consists almost exclusively of the detail of a series of contests with the Danes, who now continued with incessant perseverance those descents upon the English coasts which they had commenced in the preceding reign. In 837 three squadrons of them made attacks on different points nearly at the same time. The next year they landed again in great strength in Lincolnshire, and, after defeating the troops sent to oppose them, marched across and ravaged the country down to the Thames. In 839 three hard battles are recorded to have been fought at Rochester, Canterbury, and London, besides an action at sea, near Charmouth, in which the English fleet, commanded by Ethelwulf in person, sustained a defeat. For some years after this however the Northmen, abandoning Britain, directed all their efforts against the coasts of France. But in the latter part of the year 850 a body of them landed in the Isle of Thanet, when, so ill-prepared was Ethelwulf for the attack, that the foreigners were enabled for the first time to pass the winter in the country. In the spring of 851 they were joined by great numbers of their countrymen, and the whole multitude ascending the Thames in a fleet of 350 vessels, plundered Canterbury and London. They then penetrated into Surrey; but here they were met by Ethelwulf at Okeley, and after a long and obstinate battle, were defeated with immense loss. They were soon after worsted in another battle at Wenbury, in Devonshire, and also in a sea-fight near Sandwich by Athelstane, the king of Kent. The consequence was that the Danes did not again make any attempt on England during the reign of [illegible].

In 852, on the death of Athelstane, the kingdom of Kent was [illegible] by Ethelwulf to his second son, Ethelbert, he himself retaining the chief sovereignty as before. The following year, at the request of Beohred, or Burhred, king of Mercia, he [illegible] against the Welsh, and marched through their [illegible] as far as the Isle of Anglesey, compelling them to acknowledge themselves the subjects of [illegible]. On the termination of this expedition he gave his daughter [illegible]lswitha in marriage to the king of Mercia. In [illegible] he undertook a journey to Rome, accompanied by his youngest son Alfred, who had been also carried to that city in the preceding year by bishop Swithin. Ethelwulf had by this time lost his first wife Osberga, a daughter of Oslac, designated the king's cup-bearer; and now, on his return through France, he fell in love with Judith, daughter of Charles the Bald, king of that country, and married her, although she had not yet reached her twelfth year. Meanwhile however his eldest son Ethelbald, taking advantage of his father's absence (whom perhaps he represented as being in his dotage), had entered into a scheme for seizing the throne. It is said that among his accomplices was the prime minister Alstan, and that he was also supported by the chief nobility, from which we may conjecture that the attempted revolution was not without some strong reasons in its favour. And although the return of Ethelwulf is said to have prevented the full success of the design, it was substantially carried into effect. It was agreed at a solemn meeting of the Witan that Ethelbald should become king of Wessex, and that Ethelwulf should reign as sovereign, with Ethelbert under him, in Kent and the other eastern provinces. It may be supposed that in his new position Ethelwulf enjoyed little more than a nominal authority. He spent the remainder of his days mostly in exercises of devotion, and died in 857 or 858. By his will, which was confirmed by the Witan, he left the kingdom of Kent to his second son Ethelbert, and that of Wessex in succession to his other sons, Ethelbald, Ethelred, and Alfred.

One of the legislative acts of the reign of Ethelwulf has given rise to much discussion, namely, the grant which he made in 854 or 855, with the consent of the Witan, in favour of the church, and which was wont to be considered as the original foundation of the right of the clergy to the tithes. The grant is recited by Ingulfus, Malmesbury, and Matthew of Westminster, but not in the same terms. Lingard observes that 'the copies are so different, and the language is so obscure, that it is difficult to ascertain its real object; whether it were to exempt from all secular services the tenth part of each manor, whoever might be the possessor, or to annex that portion of land to the possessions which had already been settled on the church.' It cannot, Turner thinks, have been the original grant of the tithes of all England. The 'words,' he observes, 'imply either that it was a liberation of the land which the clergy had before been in possession of from all the services and payments to which the Anglo-Saxon lands were generally liable, or that it was an additional gift of land, not of tithes, either of the king's private patrimony, or of some other which is not explained.' Palgrave contends that it was not a grant of tithes, but a grant of the tenth part of the land by metes and bounds, to be held free from all secular services; yet he admits that the interpretation which construes the grant into an enfranchisement of all the lands which the church then possessed, is 'not altogether void of probability.' (*Eng. Com.* p. 159.) There is a dispute also about the date of the grant. Palgrave conceives that [illegible] made it on his return from Rome; Turner and Lingard both place it before his journey thither. The latter adds: 'This charter was at first confined to the kingdom of Wessex; but in a council of the tributary states, held at Winchester in 855, it was extended to all the nations of the Saxons.'

ETHER. [ÆTHER.]

ETHEREGE, sometimes written ETHERIDGE, SIR GEORGE, born [illegible], was a distinguished wit and dramatic writer of the reign of Charles II. According to the usual routine of a gentleman's education at that time, he studied law at an inn of court and travelled. In [illegible] he made his first public appearance as author of the comedy called 'Love in a Tub.' 'She Would if she Could' followed in 1668, and 'The Man of Mode, or Sir Fopling Flutter,' in [illegible]. All these were received with much favour by the

public, but 'Sir Fopling Flutter' has been the most esteemed. They placed him, with Buckingham, Rochester, Sedley, &c., in the first rank of the wits of the day. Ease and brilliance of dialogue are their characteristic excellence; but they have an ingrained taint of licentiousness running through the whole conception as well as the language, which has long excluded them from the stage. If the characters are supposed (which is the author's best excuse) to be but highly coloured copies of the fine gentlemen and ladies of the day, we shall marvel that the name and estimation of gentlemen should ever have been sullied by such a total want of truth and honour. Sir George Etherege's verses are not numerous, and consist of occasional pieces, lampoons, songs, and short amatory poems, some of which are of a very licentious character. Their style may be guessed from his appellations of *easy Etherege* and *gentle George*. Rochester, in his 'Session of the Poets,' gives high praise to our author, in saying that

> Of all men that writ,
> There's none had more fancy, taste, judgment, and wit.

Fancy and wit may be allowed him: the taste and judgment stated Rochester's own. Etherege's private life may be guessed from his writings: play injured his fortune, debauchery his constitution. He repaired the former by marrying a rich widow, whose price was a title; and to win her he purchased his knighthood. He was in James II.'s household, and was afterwards employed by that king as minister to Ratisbon, where, by some accounts, he died from a fall down stairs after a convivial entertainment; but this appears uncertain. The time of his death seems to have been about the Revolution.

There is an edition of his Plays and Poems in 8vo., London, 1704, and one in 12mo., London, 1715.

ETHE'REUM, a theoretic carburetted hydrogen, consisting of 4 equivalents of carbon = 24, and 5 equivalents of hydrogen = 5: its equivalent is therefore 29. Among the various theories which have been proposed respecting the constitution of æthers, that which supposes it to contain ethereum (as it is termed by Dr. Kane, and *ethule* by Berzelius), as a base combined with oxygen, is perhaps to be preferred to all others. It is indeed true that ethereum has never been obtained in a separate state, but allowing its existence, æther may be regarded as an oxide of ethereum, alcohol a hydrated oxide of ethereum or a hydrate of æther, and sulphovinic acid may be viewed either as a hydrated bisulphate of oxide of ethereum, or a hydrated bisulphate of æther.

ETHE'RIA, Lamarck's name for a genus of Conchifers, placed by many authors among the *Chamidæ*, but separated by Deshayes and others from that family for the reasons assigned under the article CHAMACEA.

Animal closely approximating to that of *Unio*. Lobes of the mantle disunited throughout their length, and, consequently, without either tubes or syphons. Below the foot, the branchiæ of the right side unite themselves to those of the left side in the medial line, and leave below them a rather large canal, in which the vent terminates. The branchial leaflets are unequal, strongly striated and festooned on their free border. The mouth is rather large, and furnished on each side with a pair of palps like those of the *Uniones*. Finally, (and, as Deshayes observes, it is a great singularity in an animal that lives attached to foreign substances,) it is provided with a very large foot, which may be compared in regard of its form and position with that of *Unio*.

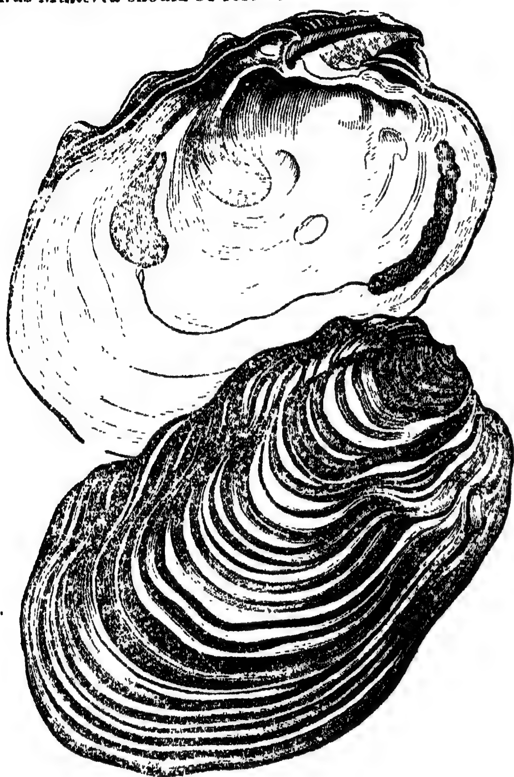
Shell adherent, thick, nacreous, very irregular, inequivalve, inequilateral; *umbones* short, thick, indistinct; *hinge* toothless, irregular, undulated, callous; *ligament* longitudinal, tortuous, external, penetrating pointedly into the interior of the shell; *muscular impressions* oval, irregular, one superior and posterior, the other inferior and anterior: pallial impression narrow and small.

Obs.—M. Deshayes observes that on examining the shells of this genus, in which the ligament is not ruptured, it appears that the ligament is not entirely internal or subinternal, like that of the oysters, but that it has completely the structure of external ligaments. It is when the shells are young that the structure of the ligament is most easily recognized. There are two muscular impressions, always very distinct in old individuals; but, in the young ones, it sometimes happens that one only can be distinguished, and it was upon an individual in this state of growth that M. de Férussac established his genus *Mulleria*, which, in the opinion of M. Deshayes, cannot be retained. With regard to the crenulations on the hinge adverted to by M. de Férussac, M. Deshayes states that he had seen on the very individual which M. de Férussac had in his hands some small fractures resulting, as it appeared to M. Deshayes, from this cause, namely, that the shell having been taken with the animal, the valves had been separated by attacking the ligament with a sharp instrument.

Geographical Distribution, Habits, &c.—Lamarck considered the genus *Etheria* to be marine, and accounted for its having escaped the notice of zoologists because it was attached to rocks at great depths in the sea. Mr. G. B. Sowerby, after noticing the locality attributed to the genus by Lamarck, remarks that two circumstances observable in the *Etheria* (*E. semilunata*), figured in his place, would have induced him to suspect that this was a fresh-water shell, or at least an inhabitant of æstuaries at the mouths of rivers: 1st, its having an epidermis, which remains only in those parts least exposed to the action of the water, the greater part especially of the upper valve being eroded in a very irregular manner; and 2ndly, its being partly covered with the remains of those ovate vesicular bodies, supposed to be the eggs of some molluscous animals so frequently seen on fresh-water shells. M. Cailliaud was the first to make known the fact that the genus is an inhabitant of the fresh waters, and M. de Férussac (*Mémoires de la Société d'Histoire Naturelle*, vol. i.) published a paper on the subject from M. Cailliaud's materials, in which the former also made a revision of the species. M. Deshayes, in his treatise on the genus (*Encyclopédie Méthodique*), states that individuals of the same species adhere by the one or the other valve indifferently, which, he remarks, is not the case with the oysters or the *Chamæ*. That *Etheria* may be attached indifferently by either valve there is no reason to doubt after the assertion of M. Deshayes; but Mr. Broderip (*Zool. Trans.*, vol. i.) observes that the same species of *Chama* is sometimes attached by the right, sometimes by the left valve. [CHAMACEA, vol. vi., p. 470.] M. Rang, during a voyage to Senegal, made some interesting observations on *Etheriæ* which live 200 leagues from the mouth of the river in the Senegal, and, together with M. Cailliaud, who received the animal from the Nile, published a memoir (*Mémoires du Muséum d'Histoire Naturelle*) full of interest, in which the animal was described for the first time. The rivers of Africa and Madagascar appear to have afforded the specimens (which are still rather scarce in cabinets) hitherto collected. M. de Férussac, in his memoirs, gives the following information from M. Cailliaud. 'We first meet with *Etheriæ*,' says that zealous traveller, 'after passing the first cataract; and they do not appear to exist below; they become very abundant in the province of Rebatat, beyond the peninsula of Meröe. The inhabitants collect them on the banks of the river, to ornament their tombs with them, and they say that they come from the more elevated parts of the Nile, from Saïda, where they are eaten.' M. Cailliaud found them as far as Fazoql, the most distant country into which he penetrated from the Blue River. In Sennaar, the inhabitants informed M. Cailliaud, that during the summer season, when the river was low, they took them with the animal; but notwithstanding all his endeavours, M. Cailliaud could not obtain any living specimens, the river being then always too high. They are said to be very common in the Jaboussi, a river which runs into the Blue River, and in all appearance the numerous confluent streams of this great arm of the Nile produce them also. The number found upon the tombs throughout Ethiopia is so great, that it is astonishing that Bruce and Burckhardt should not have mentioned them. (*Zool. Journ.*, vol. i.)

Lamarck recorded four species of *Etheria*, which he divided into two sections, each containing two species. The first of these consists of species which have an oblong callosity in the base of the shell; the second, of those which have no encrusted callosity at the base of the shell. These four species M. de Férussac (with justice in the opinion of M. Deshayes) reduces to two: so that the sections, as left by Lamarck, would each, in that case, consist but of one species, viz., the first of *Etheria elliptica*, and the second of *Etheria semilunata*. M. Deshayes remarks that Lamarck saw but a very small number of individuals, and not being aware of their extreme variation, established species from the form of the shell; and it is certain, he adds, that if we were to follow the same indication at the present day, we

might establish a species for each individual. He notices M. Rang's judicious observation, that in the same species there are individuals armed with spines, and others devoid of those appendages, and that the shades of this character are so gradual that it is impossible to regard it as of the smallest importance. In following out this principle, M. Rang considers *Etheria tubifera* of Sowerby and *Etheria Cailliaudi* of Férussac as identical, and *E. Carteroni* of Michelin to be the same as *E. plumbea* of Férussac. It is to the last-named species that M. Deshayes thinks that the genus *Mulleria* should be referred.



Etheria semilunata.

Etheria, or, as some write it, *Ætheria*, has not yet been discovered in a fossil state. It should be remembered that Rafinesque uses the term for a genus of Macrourous Crustaceans belonging to the *Palæmonidæ*.

ETHERINE, a peculiar carburetted hydrogen, which has also been regarded as the basis of æther. It is supposed to consist of 4 equivalents each of hydrogen and carbon.

ETHERO-SULPHURIC ACID—ETHIONIC ACID. This acid is prepared by passing the vapour of anhydrous sulphuric acid slowly into absolute alcohol kept cold; by their mutual action an oleaginous fluid is formed, without the evolution of any gaseous matter. This fluid is to be mixed with water and saturated with barytes, by which a portion of sulphate is separated, and ethero-sulphate of barytes is obtained by evaporation in vacuo.

The acid in this salt is stated to consist of—

Two equiv. of sulphuric acid . . .	80
One equiv. of etherine	28
One equiv. of water	9
Equiv. of ethero-sulphuric or ethionic acid	117

It may be considered either as a hydrated bisulphate of etherine, or as an anhydrous bisulphate of æther, or of oxide of ethereum.

ETHICS is the science which relates to our mental affections, not simply as phenomena, but as they are virtuous or vicious, right or wrong. (Dr. Thomas Brown's *Lectures*, p. 486, Edinb., 1830.) The term is derived from the Greek ἠθική, which, in signification, is equivalent with the Latin *mos*, *mores*, whence the adjective *moralis*, and the English word *morals*. Aristotle, in the second book of his Ethics, addressed to his son Nicomachus, says that moral science received the name of ethics from the word *éthos* (ἔθος), 'habit, use, or custom,' (ἠθικὴν, ἀπὸ τοῦ ἔθους, or ἀπὸ τῶν ἠθῶν), since it is from habitual experience, and the routine of customary conduct that moral dispositions and principles are gradually formed and changed. Cicero, in his work on moral ends (*De Finibus*, l. 1 and 5) briefly defines ethics, or morality, as the 'ars vivendi,' or 'doctrina bene vivendi,' that is, the art of living wisely. The scholastic treatises on ethics divide the practical part of the science into three departments *éthike* (ἠθική), which shows by appropriate precepts what is the duty of a good man; *œconómike* (οἰκονομική), which shows what is the duty of a good father of a family; and *politike* (πολιτική), which exhibits the duty of a good citizen, and of a good magistrate. [MORALS.]

E'THICUS, or Æ'THICUS, is conjectured to have lived about the fourth century of our æra, and is the reputed author of a Cosmography or short description of the world, being an enumeration of the seas, islands, provinces, mountains, rivers, and towns of the then known world, with a short account of the sources and course of the principal rivers. In speaking of the Tiber's course through Rome, he mentions the gate of St. Peter, that of St. Paul, and the Via Portuensis, or of 'the martyr St. Felix.' He also speaks of Rome as the mistress of the world, of the games held by the Romans, of the præfectus urbis, &c. These circumstances may serve to fix the time of the compilation of the work towards the end of the fourth century, when Rome had become completely Christian, but yet before Alaric's invasion. Æthicus and his Cosmography are mentioned by several writers of the following ages, and among others by Isidorus of Seville, who lived in the early part of the seventh century. Rabanus Maurus (*de Inventione Linguarum*), a writer of the ninth century, calls Æthicus 'a Scythian;' and Flodoardus, a writer of the following century, calls him 'Ister' from 'Istria.' (Vossius, *de Historicis Latinis*, b. iii.) At the beginning of his Cosmography Æthicus states that Julius Cæsar, during his consulship with M. Antony, by virtue of a senatus consultum, ordered a survey of the Roman world to be taken, and that the work was entrusted to three geometers, Zenodoxus for the eastern part, Polycleitus for the south, and Theodotus for the north, who completed their work under Augustus. This survey was probably the source from which the Antonine Itinerary was derived, which Itinerary in its present shape has also been attributed by some to Æthicus. [ANTONINUS, ITINERARY OF.] The Cosmography in most publications is followed by another and somewhat fuller description of the various parts and provinces of the world, apparently of the same period, entitled 'Alia totius Orbis Descriptio,' and generally attributed to Æthicus also, though there are doubts concerning his authorship. This second work is also found almost literally in Orosius, forming the second chapter of his history. It has been suggested that Orosius may have copied it from Æthicus, and the text of Orosius has certainly the appearance of a copy, as he has shortened the beginning or introductory part, and also left out the concluding sentence, in which the author of the description, as we have it separately, promises to give a continuation of his work, or an ampler description of the towns, &c., beginning from Rome, which he styles 'Caput Mundi et Domina Senatus.' (Simler's edition of Æthicus, Basil, 1575.) This last sentence promising a fuller account, which the author did not fulfil or which has been lost, would not have fitted Orosius's historical narrative, and therefore he left it out. But it is also worthy of remark that in two MSS. of Orosius in the national library at Paris, Nos. 4878 and 4882, the second chapter ends with these words, which are not found in the other MSS. and printed editions of Orosius: 'Percensui breviter ut potui provincias et insulas Orbis Universi, *quas Solinus ita descripsit*.' This would seem to attribute the work to Solinus.

To the two Cosmographies attributed to Æthicus is added, in some editions, another extract, which is styled 'Julii Honorii Oratoris Excerpta quæ ad Cosmographiam pertinent.' It is in its plan similar to the first Cosmography of Æthicus, only perhaps still dryer and more incorrect. The three have been published, together with Pomponius Mela, by Gronovius, Leyden, 1635.

ETHIO'PIA (Αἰθιοπία) was the name given by the antient geographers to the countries south of Egypt. In a more general and vague sense they called Ethiopians all the inhabitants of the south part of Africa, from the Red Sea to the Atlantic. Herodotus (iv. 197) speaks of the Ethiopians as inhabiting the whole of South Libya (Libya is with

him synonymous with our Africa), as distinguished from the Libyans who inhabited the Mediterranean coast and the interior adjoining it. He also speaks of the Ethiopian Troglodytes (iv. 183) who lived to the south of the Garamantes, and tells strange stories of them; but these particular Ethiopians must be considered included under the general name. Strabo places the Hesperian Ethiopians near the Atlantic Sea, and south of the Pharusii and Negretes, who were themselves south of the Mauri. In this general sense, Ethiopians corresponded with the inhabitants of the countries south of the great desert, of which the antients knew very little. Herodotus (vii. 70) also speaks of Asiatic Ethiopians, who formed part of the great army of Xerxes; but their locality is not easily determined. The historian however observes that the Asiatic Ethiopians were black, like those of Libya, but differed from them in language, and had straight hair; whereas those of Libya had very *curly* hair, by which term some modern writers have perhaps too hastily concluded that the woolly hair of the negro is intended. But Eastern Ethiopia, properly called Ethiopia above Egypt (Herod., vii. 69), and also Ethiopia Orientalis, was a distinct and better-defined country. It included those regions which we now call by the name of Nubia and Sennaar, and perhaps part of Abyssinia, but to the south its limits were not known. Herodotus, however, it should be observed, clearly distinguishes the Ethiopians immediately south of Egypt from those whom he calls long-lived Ethiopians (iii. 17), whom he places on the shores of the southern sea. But what country we must consider as inhabited by these long lived Ethiopians, it seems impossible to say.

Meroe, which lay above the confluence of the Astaboras (Tacazze) and the Nile, was the antient capital of Ethiopia, in the limited and more definite sense of Ethiopia above Egypt, in which sense we shall now consider the term. The Troglodytæ bordered upon Ethiopia to the east, extending along the coast of the Red Sea. To the west of Ethiopia were the Blemmyes, a barbarian tribe, of whom wonderful stories were told as having no heads, but eyes and a mouth fixed in the breast. Ethiopia was a country early reduced to a fixed social state, and was held traditionally to have been the parent of Egyptian civilization and religion. Its government was monarchical, but the monarch was subordinate to an all-powerful hierarchy, more absolute than that of Egypt. Diodorus (iii. 6) says, 'in Ethiopia, when the priests think proper, they send a message to the king with orders for him to die, the gods having so communicated their pleasure, which no mortal should dispute.'

It has been long a subject of discussion among the investigators of antiquity whether the arts of civilized life descended from Ethiopia to Egypt, or ascended from Egypt into Ethiopia. Here, as in many other contested historical points, much discrimination is required. It would appear, from tradition, that at a very remote period religious colonies came down from Meroe into Egypt. Herodotus (ii. 29) says, 'at Meroe, the great city of the Ethiopians, the people worship only Zeus and Dionysus (Ammon and Osiris), and them they honour greatly. They have an oracle of Zeus, and they make their expeditions whenever and wherever the Deity, by his oracular answers, orders them.' This shows that the priests of Meroe sent colonies into other countries, and Egypt was naturally one of the first lands to which they would resort. The worship of Ammon (the Zeus or Jupiter of the Greeks and Romans), which was carried by them down the Nile, was a simpler and purer form of worship than the absurd assemblage of deities which afterwards gained ground in Egypt. The procession of the Holy Ship, with the shrine of the ram-headed Ammon, which took place annually at Thebes, and which was carried across the Nile to the Libyan side and brought back after a few days, was in commemoration of the first advent of the god from Ethiopia by the river. This ceremony is sculptured on several Egyptian and Nubian temples, and especially on the great temple of Carnak. Homer probably alludes to it when he speaks of Jupiter's visit to the Ethiopians and his twelve days' absence. It appears also that the worship of Isis descended the Nile from the farthest regions of Ethiopia. Diodorus (iii. 3) says that 'the people above Meroe worship Isis and Pan, and besides them Hercules and Zeus, considering these deities as the chief benefactors of the human race.' Isis' heads have been found by Cailliaud at Naga, near Shendy, (about 17° N. lat.) in Upper Nubia, the sculptures bearing all the marks of an original style, though of a coarser art than that displayed in the same figures in the Egyptian temples. The head of Isis is placed above that of Typhon, as in some of the temples of Egypt. These temples of Naga however may be supposed, from their style and sculptures, to be of a later date than those at El Mecaourah, which are also in the district of Shendy, in a valley in the desert, at some distance from the Nile, and about twelve miles nearly north of Naga: they consist of eight temples, of small dimensions, the largest being only thirty-four feet long, connected by galleries and terraces, with a great number of small chambers, the whole being surrounded by a double enclosure. There are no tombs nor remains of private habitations in the neighbourhood. Traces of a large tank are seen, protected from the sand by mounds of earth all round it, the water of which served probably for religious and other purposes. The materials of the buildings are on a small scale, as well as the buildings themselves, the stones seldom exceeding one foot in length and half that in height. No sculptures or hieroglyphics adorn the walls; only on the six pillars which form the portico of the larger temple are there hieroglyphics and figures in the Egyptian style. This temple seems to be of a much later date than the rest (Cailliaud, *Voyage à Meroe*, and *plates*, and an article on the same in the Foreign Quarterly Review, No. 4, June, 1828.) It is supposed that this secluded enclosure may have been the sacred city of Meroe, the college of its priests, and the original seat of the oracle of Jupiter Ammon, whence issued those religious colonies which carried religion and civilization from Ethiopia as far as the Delta and the Oasis of the Libyan desert. According to the tradition of the country, the name of El Mecaourah was that of the antient fakirs or recluses who inhabited these edifices.

The ruins of Meroe itself are now believed to be those discovered by Cailliaud at Assour, above the confluence of the Atbara or Tacazze and the Nile, and its situation between the two rivers probably gave rise to the appellation of the Island of Meroe. The extent of the ruins is said to be more considerable than that of Napata, near Barkal, or of any other place yet examined in Nubia; they are also in general more dilapidated, and vast mounds of rubbish appear heaped up everywhere, as if formed by the ruins of private as well as public buildings. The latter consist, as at Napata, of temples and pyramids. Of the temples there is not one the remains of which can be traced with any certainty; the front wall of the largest appears to have been twenty-five feet thick. The pyramids stand in groups on the borders of the desert. The largest is about sixty feet at the base, but most of them are much smaller, and generally in a ruinous state. Most of the pyramids have little exterior sanctuaries attached to them, and in one of them Cailliaud found the roof arched with a key-stone, as in those of Mount Barkal.

The connection between Egypt and Ethiopia was renewed at various periods remote from each other, and under various circumstances. Herodotus says that he saw in the records of the priests of Memphis (ii. 100), 18 Ethiopian kings registered among the 330 successors of Menes, who preceded Sesostris. Whatever we may think of this scroll of kings, still it shows that a tradition existed of a very remote influence of Ethiopia over Egypt. This perhaps was the epoch when the worship of Ammon and Osiris was introduced into the latter country. Osiris, according to tradition, led a colony from Ethiopia into Egypt, which received also from the parent state the practice of deifying kings, together with hieroglyphical writing, the usage of embalming, the whole sacred ritual, and the forms of their sculptures. (Diodorus, iii. 3.) Afterwards Sesostris is said to have conquered Ethiopia; but this was probably a partial incursion, for Herodotus (ii.) says that Ethiopia was never conquered by any foreign power. We hear nothing of the intercourse between Ethiopia and Egypt for many centuries afterwards, during which the latter country made great progress in civilization and the arts, and built its stupendous monuments. In the eighth century B.C. the Ethiopian invasion of Egypt took place, and Sabakos, an Ethiopian king, reigned over both countries. Herodotus, who lived between two and three centuries later, says that Sabakos evacuated Egypt in obedience to an oracle, a fact which shows that the power of the Ethiopian hierarchy still continued in full vigour. Still we find other Ethiopian kings ruling successively over at least part of Egypt; among others, Tir-

hakah, mentioned in the Scriptures as having fought against Sennacherib. The commentators on the book of *Kings* (ii. 19) have considered Tirhakah to be an Arab chieftain; an error disproved, as it is considered, by the existence of his name on one of the buildings of Thebes. This period of renewed intercourse between Egypt and Ethiopia, under circumstances highly favourable to the latter, was probably the time when the improved arts of Egypt were introduced into Ethiopia, and it was probably then that the splendid structures of Mount Barkal were executed; a supposition which would be confirmed, if it be true that the name of Tirhakah is found in the hieroglyphical cartouches in the Typhonium of Barkal, according to Champollion's system. Again, under the Ptolemies there is evidence to show that Græco-Egyptian colonies found their way into the regions of the Upper Nile, and along the shores of the Red Sea, and even as far as Axum and Adule in Abyssinia [ADULE; AXUM]: these colonies or adventurers probably spread the Egyptian arts as improved by the Greeks into Ethiopia. All these vicissitudes may account for the various styles of building and sculpture found along the banks of the Upper Nile. The monuments of Assour and el Meçaourah are probably older than those of Naga, and these much older than those of Barkal, which are probably anterior to the temple of Soleb. We know from a passage of Diodorus that after the Ptolemies came to reign in Egypt a great change took place in Ethiopian politics. In the time of the second Ptolemy the Ethiopians had a king Ergamenes who had a knowledge of Greek manners and philosophy. Being weary of the yoke of the hierarchy, he went with a band of soldiers to the inaccessible place (Barkal?) which contained the golden temple of the Ethiopians, and massacred all the priests. (Heeren's work on Egypt, and the *Egyptian Antiquities in the British Museum* in the *Library of Entertaining Knowledge*.)

Of the manners of the Ethiopians we know little, except what we may infer from their monuments and the scanty records we have of their religion and institutions, as above stated. Their sacred language appears to have been the same as that of the Egyptian priests. From some sculptures at Barkal, it would seem that human sacrifices were occasionally in practice. [BARKAL.] A peculiarity in the Ethiopian institutions is, that their women sometimes went to battle, and were not excluded from the throne. Strabo (Casaub., p. 820) speaks of the Ethiopian warrior queen named Candace. (See also *Acts of the Apostles*, viii. 27.) On the propyla of one of the temples of Naga, besides the hero or king, is a female figure likewise of regal dignity, with a large knife in each hand, going to cut off the heads of a number of captives; the vulture is hovering over her head. The figures of both king and queen are remarkable for the magnificence of their dress, and though they have many characteristics of Egyptian style, they are much thicker than the Egyptian form, especially the female, which is remarkably large from the vest downwards. (See Cailliaud's Plates, 14. 16.)

After the Romans became possessed of Egypt, we read of several expeditions into Ethiopia, but of no permanent impression made by them upon that region. Caius Petronius, prefect of Egypt under Augustus, is said to have advanced as far as Napata, called Tenape by Dion, the first town of Ethiopia after Meroe He defeated Queen Candace, who was obliged to sue for peace But the Romans ultimately kept none of their conquests in that quarter. In subsequent times it appears that they conquered again, and retained a strip of territory along the banks of the Nile of seven days' march above the first cataract, but this was given up by Diocletian to the Nubæ or Nabatæ, on condition that they should prevent the Ethiopians and the Blemmyes from attacking Egypt. Of the vicissitudes and ultimate dismemberment of the antient kingdom of Meroe we have no information.

The early Christian historians seem to restrict the name of Ethiopians to a people occupying part of the country now called Abyssinia. Procopius and Cedrenus call the Axumites Ethiopians. [See the articles ADULE and AXUM.] From those times the name of Ethiopia has been given more particularly to Abyssinia, and the Geez or sacred language of that country has been called Ethiopian. [ABYSSINIA.]

The origin of the name 'Ethiopia' is uncertain. Salt says that Itiopjawan is the favourite term by which the Abyssinians designate themselves; but this name was probably introduced among the Abyssinians by the half Greeks of the kingdom of Axum. The word in Greek has the appearance of being significant, and is sometimes interpreted 'dark-coloured;' but like many other Greek names of nations, it is probably a native Asiatic or African term corrupted into the semblance of a genuine Greek word.

ETHIOPIAN LANGUAGES. Under the general designation of the Ethiopian languages, three different dialects are usually comprised, viz., the antient Ethiopian, or Geez, the Tigré, and the Amharic. The antient language properly called the Ethiopian is now extinct, or at least survives only as the language of books and of learned men (whence it is also called *lesana mas'haf*, or book-language); and its place is now supplied by the two other dialects, of which the Tigré approaches nearest to the Ethiopic, whilst the Amharic has more widely departed from it. [AMHARIC LANGUAGE.]

The Ethiopian belongs to the family of languages usually called the Semitic, and among them it shows the closest affinity to the Arabic. It is written from the left to the right, in a peculiar alphabet, which however appears to be of Semitic origin. (Compare the Ethiopian letters *kaf*, *nahar*, *ain*, and *geml*, with the corresponding Phœnician and Punic characters in Pl. v. and vi. of Gesenius' *Palæographische Studien*, Leipzig, 1835, 4to., and Pl. i. of the same author's *Scripturæ Linguæque Phœniciæ Monumenta*, Leipzig, 1837, 4to.) The alphabet consists of twenty-six consonants and seven vowel sounds; but the latter are not expressed by distinct characters, nor by points or accents, but by slight changes in the shape of the consonants, so that each character represents an entire syllable. It is well known that the antient Devanagari alphabet of the Hindus, and the system of orthography of many of the modern languages of India, are modelled on a similar principle. Several of the Ethiopian letters are now no longer distinguished in pronunciation; there are, for instance, three *h*'s, two *s*'s, two *f*'s, and *aleph*, and *aïn*, which are sounded alike, though still kept distinct in writing.

Gesenius calculates that about one-third of the roots and primitive words of the Ethiopian language exists also in Arabic; and a considerable portion of the remainder is found in Hebrew, or in the Chaldee and Syriac dialects. In the inflection of the Ethiopian verb ten conjugations are distinguished, consisting, like those of the Hebrew, Syriac, or Arabic verb, of certain modifications of the original import of the simple root, expressed according to strict analogy by modifications of the form of that root. We subjoin a paradigm showing the third person of the preterite in each of the ten conjugations with the corresponding inflections of an Arabic root. The Ethiopic verb *gabera* is used in those conjugations only to which we have added a Latin interpretation.

	Ethiopic.	Arabic.
Conj. i.	*gabera*, fecit	i. *Kabala*
ii.	*gabbára*, fieri curavit	ii. *Kabbala*
iii.	*gâbara*	iii. *Kâbala*
iv.	*agbara*, coegit	iv. *akbala*
v.	*agabara*	
vi.	*tagabera*, factus est	
vii.	*tagabbara*, opus fecit	v. *takabbala*
viii.	*tagâbara*	vi. *takâbala*
ix.	*angabara*	vii. *inkabala*
x.	*astagbara*, exegit (pecuniam)	x. *istakbala*

From any of those conjugations a passive voice may be derived by prefixing *ta*-. Each conjugation has, as in the other Semitic dialects, a preterite and a future tense, with a distinct subjunctive or optative form, similar to the apocopate future (*aoriste conditionnel* of De Sacy) in Arabic; an imperative and infinitive, but no participle. There is no separate inflection for the dual number either in the verb or noun. In the declension of nouns, cases are sometimes characterized by terminations analogous to those of the Arabic language. From masculine adjectives feminines are derived, nearly as in Arabic, by subjoining *-t*. The gender of substantives is twofold, masculine and feminine; yet the distinction of the two is but little attended to in Ethiopian writings. The plural is expressed as in Arabic, either by terminations (*-ân* in masculines, *-ât* in feminines), or by certain modifications of the vowels within the limits of the word.

The literature extant in the Ethiopian language is almost

exclusively biblical and ecclesiastical. The Ethiopians possess a complete translation of the Old and New Testament, made by an unknown author from the Alexandrian text of the Greek version, probably not anterior to the fourth century; besides an apocryphal writing, peculiar to themselves, called the book of Henoch, which is supposed by De Sacy to have been written during the reign of Herod the Great, and to be the book quoted in the Epistle of St. Jude (v. 14). (See *The Book of Enoch the Prophet*, &c., translated by Richard Lawrence, Oxford, 2nd edit. 1833.) There exists moreover a translation of the Didascalia, together with 56 *canones* and 81 *constitutiones* or rules of the early Christian church, considered by the Ethiopians as apostolical; besides a collection of the decrees of the councils, extracts from the writings of the early fathers, liturgies, martyrologies, and histories of saints. Hymns are not unfrequent: they are not written in any regular metre, but sometimes show a rude sort of rhythm, and often every three or five lines end in the same consonant, which constitutes a kind of rhyme. The profane literature of the Ethiopians comprises several chronicles, which appear to be of considerable interest, but have not yet been made generally accessible. Among these the Chronicle of Axum deserves to be particularly noticed, a copy of which was brought to Europe by Bruce, and is now preserved at Chelsea College, in the possession of the family of that traveller, along with numerous other oriental manuscripts left by him.

The Ethiopians have no grammars nor a dictionary, properly so called, of their antient language, and only possess vocabularies, in which words are classed according to the subjects to which they refer. In Europe the Ethiopian language was almost unknown till Job Ludolf (or Leutholf), assisted by a native of the country, made himself master of it. His first attempt at an Ethiopic dictionary and grammar was published at London, in 1661, in 4to; a much improved and enlarged edition of both works appeared at Frankfort in 1702. Since the publication of these works, little progress has been made in our knowledge of the Ethiopian language; to them therefore we refer such of our readers as may wish for further information on the subject.

ETHIOPS, a term now obsolete, but formerly used by the old chemists to denote various dark coloured metallic preparations; as *Ethiops Martialis*, which is black oxide of iron; *Ethiops Mineralis*, which is a black mixture of mercury and sulphur, &c.

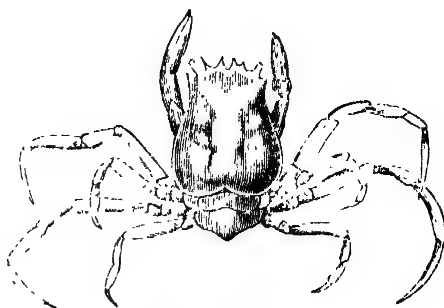
ETHULE. [ETHEREUM.]

ETHU'SA, a genus of brachyurous crustaceans (Tribe *Dorippians*), established by M. Roux at the expense of the genus *Dorippe* of Fabricius and other naturalists.

M. Milne Edwards observes that this genus is easily distinguished from *Dorippe* by the conformation of the apertures leading to the respiratory cavity, which here present the normal disposition.

Carapace, nearly quadrilateral, but rather longer than it is wide, and very much flattened; *front* large, *orbits* directed forwards, very incomplete; *eyes* carried on a rather long and very projecting peduncle; they pass beyond the external angle of the carapace, and are not retractile. The *internal antennæ* are bent back (se reploient) forwards, in fossettes placed under the front; the *external antennæ* are rather long; their first joint is cylindrical, and separates the antennary fossette from the orbit; the third is longer than the second. The buccal frame (*cadre buccal*) is triangular, and reaches to the border of the antennary fossettes; the *jaw-feet* are much shorter, and leave naked the anterior portion of the jaw-feet of the first pair, which complete forwards the canal of the respiratory cavity; the third joint of the external jaw feet is shorter than the second, nearly oval, sharply truncated forwards, and articulated with the following joint by the middle of its anterior border. The *Pterygostomian regions* are nearly quadrilateral, and are not prolonged between the base of the external jaw-foot and of the first thoracic foot, as in the Dorippes. The *Sternal Plastron* is oval. The anterior feet are short and slender in both sexes; in bending they form a double elbow, as in *Homola*. The succeeding feet are long, especially those of the third pair; those of the fourth pair are, on the contrary, extremely short, and inserted below the preceding; finally, the posterior feet, longer than the fourth pair, are inserted above and in front of them, and, like them, are terminated by a very short, hooked, and subcheliform tarsus. The *abdomen* in the male has seven distinct joints; in the female it has only five: the two first rings are directed backwards and on the same plane with the carapace.

Example, *Ethusa Mascarone* (Roux), *Cancer Mascarone*, Herbst.



Ethusa Mascarone.

ETIENNE. [STEPHENS.]

ETIENNE, ST., a town in France, in the department of Loire. It is on the left or south-west bank of the Furand, a tributary of the Loire, 255 miles south-south-east of Paris in a straight line, or 317 miles by the road through Fontainebleau, Nemours, Montargis, Briare, Nevers, Moulins, Roanne, and Montbrison; or 318 miles by the road through Melun, Sens, Joigny, Auxerre, Avallon, Autun, Châlons sur Saône, Macon, and Lyon; from which last town it is distant 33 miles. It is in 45° 26′ N. lat., and 4° 23′ E. long.

St. Etienne is of comparatively modern origin. In the troubled reign of Charles VII. the townspeople obtained permission to inclose their town with walls: this was granted A.D. 1444, but the space inclosed is said to be only a tenth of that which St. Etienne now covers. The town was then called Furania: it takes its modern name from St. Etienne, a bishop of Lyon, at the beginning of the sixteenth century. The particulars which follow are chiefly from the 'Itinéraire Descriptif' of Vaysse de Villiers, Paris, A.D. 1816, corrected by some later though less ample authorities.

The site of the town may be distinguished at a distance by a dense cloud of coal smoke. It is situated in the midst of a coal-field, and coal is the only fuel employed in the various manufactories and workshops. The town is, especially the outskirts, very dirty; in summer the streets are dusty, in winter muddy, and when it rains the black dust, washed by the rain from the roofs, converts the streams that fall from the gutters into little better than ink. The houses, both in the centre and outskirts of the town, are built of a coarse-grained grey sandstone (un gres gris à gros grains), sometimes squared, at other times unhewn, the colour of which adds to the sombre character of the place, and deprives the town of that handsome appearance which its wide and tolerably straight streets and well-built houses would otherwise give to it. The centre of the town is occupied by a large and handsome though irregularly-shaped open space or 'place,' in the middle of which is a fountain adorned with a small obelisk. From this 'place' opens a new street running above half a mile in a straight line in the direction of Roanne, and terminating in the only promenade which the town possesses: the road continues in the same line for two or three miles to the village of St. Priest, where the ruins of a Gothic castle on a hill terminate the view. There are baths, a theatre, and a town-hall; the last building is handsome.

The population of St. Etienne, in 1832, was 33,064; including the neighbourhood it may be calculated at more than 50,000. Its increase of late years has been very great. The town owes its prosperity to its situation in the coal district, which not only furnishes the inhabitants of the neighbourhood with a considerable article of export (for much coal is sent to Paris), but enables the townspeople to carry on their various manufactures. The coal is abundant and of good quality; the colliers belong rather to the neighbourhood than to the town itself. The inhabitants of the town are employed either in the manufacture of firearms (which are made here to a far greater extent than in any town of France), knives, locks, and other hardwares, or in the weaving of ribands, in which it is also pre-eminent. Whole families devote themselves to each kind of manufacture: the women work in the same factory with the men, and sometimes share with them the most laborious parts of their task. There were, a very few years since, a royal

manufactory of fire-arms, forty manufactories of arms of all kinds, ten of cutlery, forty-five of hardwares, and one hundred and fifty of ribands and velvet. The waters of the Furand, which is but a small brook, are well calculated for tempering iron and steel, and also for dyeing. A railroad, more than 34 miles long, connects St. Etienne with Lyon: this work has been carried on in spite of great difficulties; hard rocks have been cut through and hollows filled up: there is a tunnel through a mountain near St. Etienne. As many as 1800 carriages are said to pass daily between the towns: stone is quarried near St. Etienne.

St. Etienne has a high school, a school for miners, a deaf and dumb school, a course of instruction in geometry and mechanics, applied to the arts, a society of agriculture and trade, and a public library.

It is the capital of an arrondissement, containing in 1832 a population of 149,189: the arrondissement is small, but there are in it several towns which are engaged in various branches of trade, similar to those carried on at St. Etienne; Chambon and Firmini, where nails and ribands are made; St. Chamond, where ribands are manufactured; and Rive de Gier, where coal is dug and iron cast. A late return assigned to the arrondissement 47,750 workmen of all kinds; of whom 3000 were colliers, 2400 engaged in iron and steel works, 3800 in manufacturing cutlery and hardwares, 2800 in making fire-arms or weapons for war or the sports of the field, 3000 in making nails, 1800 in glass works, 2900 in preparing silk, and 27,500 in the manufacture of ribands. The value of the raw materials on which these workmen were employed was estimated at 36,885,000 francs, or about 1,500,000*l.*; and it was considered that this value was doubled by the various processes of r[illegible] ture.

Before the Revolution, St. Etienne had se[illegible]gious houses.

ETI'SUS, a genus of brachyurous crustaceans (Cancerians of M. Milne Edwards).

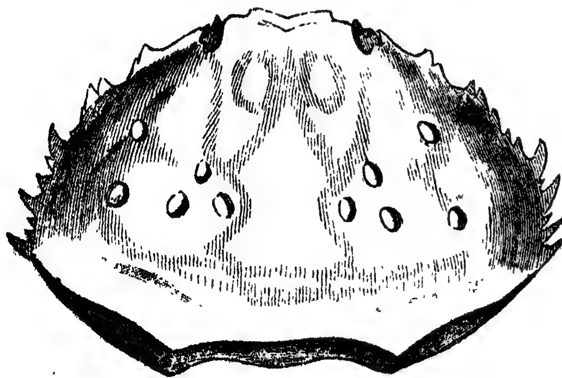
Carapace less oval and wide than in most of the Arched Cancerians (Cancériens arqués). The front is large, lamellar, and divided on the mesial line by a fissure, as in the *Xanthi*; but the two large and truncated lobes which form the principal part are separated by a deep notch of the anterior and superior angle of the orbit, which is rounded and projecting; the latero-anterior borders of the carapace are strongly toothed. The *Internal Antennæ* are bent back nearly longitudinally, and the basilary joint of the *External Antennæ*, which is very large, unites with the front, and presents on the external side a prolongation which fills the hiatus of the internal orbital angle; finally, the moveable stem of these antennæ, which is very short, is inserted completely out of this hiatus, below the front and nearer to the antennary fossette than to the orbit. The external *jaw-feet* present nothing remarkable; the *feet* of the first pair are rather large, and the *chelæ*, which are much enlarged and rounded at the end, are deeply hollowed into a spoon-shape.

M. Milne Edwards, who gives the above description, divides this small group, which he considers as forming the passage between the *Xanthi* and *Platycarcini*, into the two following sections.

α.

Carapace scarcely knobbed above.

Example, *Etisus dentatus*. Length three or four inches; colour reddish. Locality, the Indian Archipelago.



Etisus dentatus.

β.

Carapace covered with knobs, separated by deep furrows

Example, *Etisus anaglyptus*; length about an inch and a half; colour whitish? Locality, Australasia.

ETNA. [Ætna.]

ETON. [Buckinghamshire.]

ETRU'RIA was the name given by the antient Romans to a region of Italy extending in their time from the river Macra to the Tiber, and from the Apennines to the Tyrrhenian Sea, the inhabitants of which they called Tusci, and at a later time Etrusci. The natives of Etruria however called themselves Rasena. The Greeks called them Tyrrheni, confounding them, according to the opinion of some critics, with the Tyrrhenian Pelasgi, who had occupied the western coast of Italy at a more remote date, and who being driven away by the Umbri, the Etruscans, and other Italian nations, wandered back to the Grecian islands and coasts, where they became known as pirates. But the traditions of these early migrations into and from the Italian peninsula are so extremely obscure, the statements of antient writers concerning them are so conflicting and perplexing, that the investigation is become a real labyrinth, and we can only refer inquisitive readers to Niebuhr's *History of Rome*, i., p. 1—145, and to the different systems maintained by several Italian writers, and especially by Micali in the last and much improved edition of his work, *Storia degli Antichi Popoli Italiani*, 3 vols., with an Atlas, 1832, in which he examines and combats several of Niebuhr's positions. Leaving aside the question of the origin of the Tusci or Etrusci, we find this people several centuries before the time assigned for the building of Rome settled in Italy, both north and south of the Apennines, in the plains of the Po, and on the banks of the Arno. They had conquered a great part of this vast tract of country from the Umbri, one of the oldest Italian people of which history has preserved the name. The Etruscans are said by Pliny the Elder (iii. 14) to have conquered 300 towns or villages belonging to the Umbri, who, after their subjugation, appear to have become in a great measure incorporated with the conquerors, who thus extended their dominions across the centre of the Peninsula from the Adriatic to the Mediterranean. Cupra maritima, now Grottamare, in the territory of Fermo, on the Adriatic coast, and Cupra montana, which stood near the banks of Æsis, not far from the present village of Masaccio, in the province of Ancona, were Etruscan colonies. Of the great plain of the Po, the Etrusci occupied the central part, from the left bank of the Ticinus and the right bank of the Trebbia, which separated them from the Ligurians on that side to the Athesis or Adige, which divided them from the Veneti, who remained in possession of the coast of the Adriatic as far as the mouths of the Po. (Livy, v. 33.) South of the Po the Ligurians retained possession of the highlands of the Apennines as far eastward as the sources of the Arno, which river formed at first the boundary between them and the Etruscans, who afterwards extended to the Macra, where they built Luna. The Etruscan towns in the plain of the Po are said to have been twelve, like those of Middle Etruria, south of the Apennines; but Mantua and Felsina (Bologna) were the only two remaining in the time of Pliny. The others had been destroyed by the Gauls long before. The Etruscan origin of Adria has been disputed. For the names of the other Etruscan towns north of the Apennines see Mazzocchi *Catalogo alfabetico de' Luoghi compresi nell' Etruria circumpadana*.

Towards the south, Etruria is known to have extended as far as the Tiber previous to the existence of Rome. But the Etruscans at one period went also far beyond that river. There was a tradition of their having conquered the Volsci, who afterwards recovered their independence. (Servius in *Æneid.* xi. 567.) Their regular settlement in Campania, where they are said to have also built twelve towns, was however of a later date, probably in the second or third century of Rome, when the Etruscan power, south of the Apennines, was at its height, and after they had lost by the Gallic irruption all that they possessed in the plains of the Po. The Etruscan colony founded at Capua would fall, according to Cato's statement, about the year 283 of Rome. The war of the Etruscans against Cumæ, in which they were defeated by the Syracusans in a naval fight, had happened some time before. According to this calculation the Tuscan dominion in Campania did not continue long, as the country was conquered by the Samnites about the year 330 of Rome. The extent of the Etruscan possessions in

Campania, and the number of towns which they built or colonized there, is a matter of much doubt. (Niebuhr, vol. i., *On the Opicans and Ausonians*, and, for a conflicting opinion, Micali, vol. i., ch. 7.)

The permanent power of the Etruscans lay in Etruria Proper, or Etruria Media as it has also been called, which corresponds in great measure to the present Tuscany, with the addition of that part of the papal state which lies on the right bank of the Tiber. For a geographical description of the country we refer to TUSCANY. They had twelve principal cities or states, all situated between the Arno and the Tiber, for the country between the Arno and the Macra was annexed at a later period by conquest over the Ligurians. Each state formed an independent community, the twelve being bound together by a sort of loose confederacy: at times indeed very loose, for we find repeatedly one state going to war without the assistance or interference of the rest. Of these twelve towns, eight are mentioned by Livy (xxviii. 45) on the occasion of his enumerating the allies who volunteered to assist in equipping Scipio's armament against Carthage: they are Cære, Tarquinii, Populonium, Volaterræ, Arretium, Perusia, Clusium, and Rusellæ. To these must be added Veii and Vulsinii, which had been previously conquered by the Romans. The two remaining may be selected from among Cortona, Cosa, Capena, and Fesulæ. It must be observed that long before that time some of the old cities of Etruria had dwindled away, such as Vetulonia, which had disappeared before the historical age of Rome, and of which even the site is not positively ascertained. Populonium, which was originally a colony from Volaterræ, probably took the place of Vetulonia among the twelve.

Antiquities.—We may here point out those towns in which Etruscan antiquities are still found, and thus convey some general idea of what we know of the state of the arts among that people:—

1. Arretium [AREZZO] was destroyed by Sulla, and no traces of Etruscan construction now exist. The remains of the amphitheatre are of the Roman period, when the town was restored by Mæcenas. But there are numerous Etruscan inscriptions, vases, coins, and other remains in the Museum Bacci at Arezzo, and a quantity of the red embossed pottery, 'Aretina vasa,' for which Arezzo was renowned of old, and of which enormous heaps of fragments have been found in the neighbourhood. Some of the figures are most delicately formed, and may be seen in the plates to Inghirami's work: *Monumenti Etruschi o di Etrusco Nome*. Some of the moulds have also been found. 2. Perusia [PERUGIA] is said by Cato, quoted by Servius, x. 201, to have been built by the Sarsinates, an Umbrian people, before the Etruscan time. It has no remains of Etruscan structures, except the sepulchral building called la Torre di San Manno, about a mile outside of the walls, with an arched vault of large polished stones, bearing an Etruscan inscription in three lines, which is styled by Maffei 'the queen of inscriptions,' and the gate, vulgarly called Arco di Augusto, which however is believed to be of Etruscan construction. (Orsini, *Dissertazione sull' Arco Etrusco di Perugia*, 1807.) A rich collection of Etruscan antiquities however is found in the Gabinetto Archeologico, with about 80 inscriptions, one of which consists of 45 lines, the fragments of an Etruscan quadriga, described by Inghirami (vol. vi., p. 360), and some handsome painted vases, bronzes, &c. (Vermiglioli, *Saggio dei Bronzi Etruschi trovati nell' Agro Perugino*, 4to., 1813.) 3. Cortona, the antient Corytum, retains unchanged the original circuit of its Etruscan walls, though repaired in several places. (*Pianta Topografica di Cortona* in Micali's *Atlas* annexed to his *Storia dei Popoli Italiani*.) The walls are built of enormous polygonal stones, well fitted together, without cement. There are other remains of Etruscan construction, among others the substructure of the palace Laparelli. An Etruscan tomb, called by the natives Grotta di Pittagora, is seen in one of the suburbs of the town. [CORTONA.] Other hypogea have been discovered in the country around, from which the bronzes and vases have been transferred to the town museum, but they belong mostly to the Roman period. (Repetti, *Dizionario Geografico Storico della Toscana*, 1835.) The Accademia Etrusca, established in 1726, whose president is called Lucumo, has published 10 vols. 4to. of Memoirs. 4. Fesulæ, now Fiesole, one of the oldest Etruscan cities, though perhaps not one of the twelve metropolitan ones. Its massive walls are its only Etruscan structure now existing; the theatre and other remains are of the Roman time, probably of the date of Sulla's colony. (See plan and views of Fiesole, plates 5, 11, and 12 of Micali's work, and also Bandini, *Lettere Fiesolane* and *Itinerario di una Giornata d' Istruzione à Fiesole*, 1814.) 5. Clusium, Camars in antient Etruscan, now called Chiusi, the country of Porsenna, built on a hill above the valley of the Chiana, was one of the most distinguished Etruscan cities. Of its old walls there remains nothing but a fragment built of large polygonal stones behind the choir of the cathedral. The present town is entirely modern. There are very rich collections of antiquities, urns, vases of old Etruscan manufacture, single coloured, and later ones, or Campano Etruscan as they have been styled, with figures of one or two colours different from the ground, gold ornaments, engraved stones, &c., in the houses Paolozzi, Sozzi, and Casuccini. The last mentioned is the richest, and a description of it by Valeriani, with above 200 plates, has been published under the title of *Museo Etrusco Chiusino*, 2 vols. 4to., 1833. 6. Volaterræ, Volterra, on a hill about twenty miles north-west of Siena, was about four miles in circumference: many parts of its walls as well as one of the gates, called Porta dell' Arco, are of old Etruscan construction, being built of large rectangular stones generally six feet in length, though some are much larger, set in horizontal layers without cement. In some places two of them alone, set side by side, form the thickness of the wall. Maffei considered the walls of Volterra as the best calculated to give a true impression of former Etruscan greatness. In the thermæ which were discovered by Guarnacci was found a mosaic, which is now in the city museum, together with numerous sepulchral monuments, statues, bassi rilievi, both in alabaster and sandstone, vases, pateræ, &c. On these monuments of the antient Etruscans we may, in some measure, read the history of their civilization and social economy, as we read those of Egypt on the monuments of that country, in default of written records. Guarnacci published a *Museum Antiquorum Monumentorum Etruscorum e Volaterranis Hypogeis Erutorum, cum Observationibus, A. F. Gori*, fol., 1744; see also Giorgi, *Dissertazione Accademica sopra un Monumento Etrusco ritrovato negli Antichi Suburbani di Volterra, l'anno 1746*, 4to., Firenze, 1752. But one of the most extensive and satisfactory works on Etruscan antiquities is the recent one of Inghirami already mentioned, *Monumenti Etruschi o di Etrusco Nome*, 5 vols. 4to. of text, with 6 vols. of plates, and 1 vol. index. Inghirami's collections represent chiefly objects found in the territory of Volterra, in the numerous hypogei discovered there; and they are intended to illustrate the state of the three fine arts among the Etruscans, for which purpose they are arranged in six classes. I. Funeral urns and cinerary vases in alabaster or sandstone, with sculptures. II. Pateræ, which Inghirami calls 'specchi mistici,' or mystical mirrors, with specimens of Etruscan linear drawing. III. Bronzes of cast or chiselled workmanship. IV. Specimens of Etruscan architecture, taken from their hypogei or sepulchral monuments, some of which are from Tarquinii, and other parts of antient Etruria. V. Vases, some such as those of Arezzo, all of one colour, either red or bluish black, with embossed figures, others with figures of different colour from the ground. VI. A collection of monuments, most of them not Etruscan, but which serve to compare with, and form a contrast to, those of Etruscan art. Inghirami has not included in his collection the inscriptions, cameos, gems, coins, lamps, &c., which may be found in other works, and especially in Lanzi, *Saggio di Lingua Etrusca*, 3 vols., 8vo., Rome, 1789, a work much more valuable for the quantity and variety of monuments which it illustrates, than for its hypothetical and now generally rejected system of Etruscan grammar and etymology.

Among the other Etruscan towns which are now destroyed, and of which nothing but ruins remain, may be mentioned—1. Cosa or Cossa, called Ansedonia in the middle ages, on a hill east of the lake of Orbetello, the walls of which are in tolerably good preservation, with several towers, and two gates. See *Pianta Topografica di Cossa e suoi Contorni* in Micali's *Plates*. 2. Populonium, near Porto Baratto, on the coast north of Piombino. The only remains are part of the walls, which are standing. Micali has given a plan of Populonia. 3. Rusellæ, the ruins of which are on a hill above the plain of Grosseto, about three miles from Batignano, and near the left bank of the Ombrone; the circuit of its walls, which consist of large rectangular blocks, is about two miles. Micali has given a plan of this also. 4. Saturnia, called also Aurinia, on the left bank of the river Albegna, near the foot

of the mountain of Santa Fiora, and on the borders of the Papal States, shows some fragments of its walls built of polygonal stones. 5. Tarquinii, the site of which is on the left bank of the Marta, near Corneto, exhibits no remains above ground, but the great number of hypogei, forming a vast necropolis in the neighbourhood, give an idea of its former importance. They are excavated in the rock, which is of volcanic formation; some of the chambers are square, fifty feet on each side, and about six feet high; the ceiling is carved into square compartments, and is supported by square pillars of the rock itself; the sides are adorned with stuccoes and paintings, some of them allegorical of the state of the soul after death, others representing funeral processions, games, banquets, &c. A number of urns, vases, mosaics, arms, and some skeletons, have been found within these sepulchres, which may be said almost to rival, for the interest they excite, those discovered in Egypt by Belzoni. The first Tarquinian hypogei were discovered about 1780, by Cardinal Garampi, and representations of them are given in D'Agincourt's work, vol. iv., plates 10 and 11. But the greatest discoveries have been made of late years, engravings of which are given in Inghirami's and Micali's works.

Farther inland, about ten miles north of Tarquinii, near the village of Canino, Lucien Bonaparte has discovered a vast quantity of similar remains of Etruscan art, of which he has formed a valuable museum at Canino, and of which he has published a description. (*Museum Etrusque de Lucien Bonaparte, Prince de Canino*, in parts, 1829.) These discoveries have revived the question between the partizans of an original Etruscan civilization, and those who derive it from the Greeks. Probably the question might be solved by admitting various epochs of Etruscan art, one anterior and the other posterior to the intercourse which existed between the Etruscans and the Greeks about the second or third century of Rome. Even in the monuments of Tarquinii and Canino two styles are discernible. Other proprietors in the same district have made further discoveries. On the right bank of the river Fiora, in the district of Montalto, extensive remains seem to mark the site of the Etruscan Vulcia, which was conquered by the Romans at the same time as Vulsinii, about the year 473 of Rome. Here also a vast necropolis has been found, with a quantity of vases, paintings, and other antiquities. At a place called la Cucumella, a group of buildings of large rectangular stones, consisting of cells and two towers, one square and the other circular, above thirty feet high, have been found buried in an artificial mound or barrow. At the top of the towers were winged sphinxes in stone, and below some lions and griffins. Micali, plate 62, gives the plan and views of these monuments, which are one of the most curious Etruscan discoveries hitherto made. In 1832 only one-third part of the mound had been dug up, so that further structures may still be found.

The site of Cære or Agylla lay near the village of Cervetere or Cervetri, between Rome and Civitavecchia. Its port, Pyrgos, was near where the coast-tower of Santa Severa is now. No remains of either have been discovered. The antient Vulsinii has been likewise completely destroyed [Bolsena]. The site of Veii has been long a subject of dispute, but it seems now ascertained to be on a steep hill, at the foot of which two streams unite, and form the Cremera which falls into the Tiber. This hill is about a mile and a half east of the hamlet of La Storta, the last stage on the northern road to Rome. The farm called Isola Farnese occupies part of the site of antient Veii. The remains which have been discovered on the spot since 1810 belong to the Roman colony sent there by Livia. The walls of Falerii, which still exist in a desert spot near Civita Castellana, are not always numbered among the Etruscan remains, as that town is said to have been built before the Etruscan conquest. The amphitheatre cut in the rock at Sutri is attributed to the Etruscans.

History and Social State.—Varro mentions the Etruscan annals existing in his time as having been written in the eighth age of Etruria, which is supposed to correspond to the fourth century of Rome. Two Latin writers, Valerius Flaccus and Cæcina, the latter a native of Volaterræ, wrote histories of Etruria, and the emperor Claudius wrote in Greek his Tyrrhenicon or History of Etruria, in twenty books; but all these are lost, as well as the books of Dionysius, in which he treated more particularly of the Etruscans. The little we know therefore of the national history of Etruria previous to their wars with Rome, is gathered from fragments and incidental notices in Greek and Roman writers. The Etruscan power appears to have been at its height in the third century of Rome, about the beginning of the fifth century before Christ. Their dominion extended over the country of the Umbrians to the Adriatic on one side, and to the Gulf of Luni on the other. After Porsenna had dictated a humiliating peace to Rome, the Tuscans overran Latium, and conquered Campania. By sea they rivalled the Carthaginians, with whom they at first allied themselves against the Phocæans, who had settled at Aleria in Corsica, but afterwards the allies quarrelled together for the possession of the same island. They fought against the Cumans and Syracusans united about the year 279 of Rome, and were defeated. Half a century later they lost Campania to the Samnites, after which the Romans began to encroach on that part of Etruria which lay between Mount Ciminus and the Tiber. Veii was the first Etruscan city that fell by the Roman arms; Falerii and Fescennia next; Sutrium submitted: Cære and Tarquinii became the allies of Rome; and the Ciminus ridge with its haunted forests formed the boundary between Rome and Etruria. The Roman arms halted nearly a century longer before they passed that boundary. The total defeat of the confederated Etruscan forces at the lake Vadimonis, in the year 444 of Rome, opened to the Romans the access into the Etruria Transcimina. Vulsinii and Vulcia fell before the slow but sure progress of their arms; the other cities, such as Arretium, Perusia, Volaterræ, Populonium, disguised their submission under the name of allies, but Etruscan independence was gone. This appears to have been a period of general corruption of manners, when all national spirit and independence became extinct, but wealth, luxury, and internal peace remained, and sensual pleasures were the chief occupation of the people; and this was also the time when the earlier Roman writers who speak of the Etruscans, such as Plautus, Cato, and Varro, became acquainted with that people. The wars and proscriptions of Sulla gave a final blow to the existence of the Etruscans as a nation; their towns were destroyed, and their lands were given to military colonists. The proscriptions of Octavianus after the battle of Perusia, completed the desolation of Etruria. The language itself gradually became obliterated among the people, and was only known to the priests, with whom it became finally extinct, probably by the spreading of Christianity in the fourth century of our æra. It is now acknowledged by Micali, Orioli, Inghirami, as well as by Niebuhr, that the Etruscan language is lost, and that its pretended affinity to Greek, as maintained by Lanzi and others, has no foundation.

With regard to the political and social institutions of the Etruscans, we cannot do better than refer to Micali's work (vol. ii., chapters 21 to 24), in which he gives a fair and tolerably well authenticated sketch of their government, their religion and morality, and their domestic manners. We ought to bear in mind that all the accounts we have of the Etruscans were written after their subjugation to Rome, and that a nation which had a political existence of eight or ten centuries must have undergone considerable chan in its manners and institutions. Each of the twelve principal cities of Etruria ruled over the population of its respective district, which was perhaps originally a conquered race. In the city itself were two orders, the hereditary families of patricians or senators, and the commonalty. Political and religious power were in the hands of the former, who elected from their own body the annual magistrate called Lucumo We know that the lucumo at times contrived, especially in times of war, to protract his term of office, and sometimes to retain it for life; but all attempts to make it hereditary appear to have failed. The patrician and hierarchal order appears to have maintained to the last its sway among the Etruscans, the arts of divination, of which it was in exclusive possession, being a powerful instrument in its hands, among a people so much fashioned to religious observances and rites, for repressing all attempts of the commonalty. Accordingly we hear of no struggles of the kind in Etruria, as at Rome; but we hear of revolts of slaves against their masters, as in the case of Vulsinii, for the Etruscans had numerous slaves. Their sway over the people whom they conquered, such as the Umbri, appears to have been mild: they did not destroy their towns, but surrounded them with walls, or built new ones; they taught them agriculture and other arts, they instructed them in religion,

and they are acknowledged to have been the civilizers of a great part of Italy. Rome derived its earlier civilization from Etruria. The art of fortifying towns with walls and towers is attributed to them. They wrought the iron which they drew from the island of Elba, they cast bronze, and they made silver vases and gold ornaments: they engraved on stone, and sculptures of primitive art are found on their oldest monuments. They are supposed by many to have been the inventors of the arch at a very remote period; Tuscan masons employed it in constructing the Cloaca Maxima of Rome. They understood hydraulics, especially the art of filling up marshes by diverting into them the course of muddy streams, which is still practised with great success in Tuscany under the name of 'colmate.' The invention of the termini, or stones fixing the limits of property, is attributed to them. The rights of property, those of paternal authority, of testamentary will, of connubia or marriages, were all fixed by law and consecrated by religious rites. Their laws concerning debtors appear to have been more humane than those of Rome, if we are to trust to a passage of Heraclides in which he speaks of the Tyrrhenians.

The Etruscans were fond of good living and of sumptuous banquets, and they are called gluttons, fat, and corpulent, by the Roman satirists. Virgil (xi. 735) accuses them of being given to all kinds of sensual pleasures. Their women seem to have had no great reputation for chastity (Plautus, *Cistell.* 2. 3. 20, and Horace, iii. *Ode* x. 11); yet we find the female sex in higher honour among them than among most nations of antiquity. The women reclined at table on the same triclinia with the men, as appears by their monuments. Their funerals were pompous, and accompanied by athletic games, but the combats of gladiators appear to have been of a late introduction, and it is believed that they originated in Campania, and from thence spread over the rest of Italy about the fifth century of Rome. From some sculptures found on their monuments it would appear as if human sacrifices were at one time in practice among them, unless these representations be symbolical, as some suppose. The mythology of the Etruscans was partly of native, partly of oriental invention. They believed in two principles, a good and an evil one, each having its respective agents or genii, and their paintings and sculptures are often representative of the perpetual struggle between the two. Twelve gods, six male and six female, at the head of which was Jupiter, formed the upper hierarchy; other inferior divinities presided over the various elements and phenomena of this earth, as well as over the occupations and domestic comforts of man. Cicero speaks very favourably of Etruscan theosophy, saying that they referred every thing to God, and that all their religious institutions were studiously calculated for the prosperity and security of the state. For further particulars on these subjects, see Micali, ch. 22 and 23, Bossi, *Storia d'Italia*, lib. i., chap. 6, and Müller, *die Etrusker;* Dempster, *De Etruria Regali*, with the continuation by Passeri, is also a work of much information, apart from the system and favourite hypothesis of the writers. These, with the other works already mentioned, form the best Etruscan library that can be collected.

ETRUSCAN ARCHITECTURE. We have no remains of Etruscan temples or other buildings, but we can form some idea of their style from their hypogei or sepulchral monuments, and also from some of their cinerary urns which represent a temple. (Micali, plate 72.) But the monuments which serve perhaps to throw most light on this subject are those discovered at Castel d'Asso, the Axia of Cicero (*Pro Cæcina*, 7), five miles south-west of Viterbo, where the rock forming one side of the valley facing the old castle is sculptured all along for more than a mile in the shape of so many fronts or façades of sepulchral monuments, the vaults themselves being excavated underneath. Similar sculptures on the rock are found at Norchia, about 15 miles south-west of Viterbo. (See Inghirami's *plates.*) These monuments, which represent a primitive style of Etruscan building, strike by their resemblance to the Egyptian style in its ruder and simpler form. Plate 62 of Micali represents a monument between Monte Romano and Corneto, with projecting architrave and lateral pillars. Vitruvius, although he lived in an age when Etruscan art had undergone considerable alteration, characterizes their buildings as 'baricephalæ, humiles, latæ,' low, wide, with heavy top ornaments. And this seems to be in keeping with the character of the people, grave, and more fond of internal comfort than of external show. What is now called the Tuscan or Tuscanic order appears to have been a sort of rude Doric, which they probably adopted from the Greeks. [CIVIL ARCHITECTURE.] Vitruvius (iv. 7) gives a description of their temples with three cellæ, but they appear to have been neither large nor splendid: the ornaments, bronzes, and plastic figures appear to have been more elaborate than the structures themselves. In the time of Vitruvius the houses of the wealthy Etruscans had external porticoes or vestibula, in which the crowd of servants and clients remained in waiting. The Atrium is also supposed by some to be of Etruscan invention. [ATRIUM.] If not the inventors of the arch, the Etruscans were certainly acquainted with it at a very early period: it is found in their sepulchral monuments, in their gates, and they used it in constructing the Roman cloacæ. Another cloaca of similar construction has been discovered near Tarquinii. Their skill in fortifying towns with walls and towers and ditches, and leaving an open space around called Pomœrium, is attested by the Roman writers, and by the inspection of the remains of their walls. The use of large polygonal stones in the construction of walls was common to other Italian people as well as the Etruscans and primitive Greeks; and the name of Pelasgic, which has been given to these walls, appears to be incorrect, as it does not distinguish any particular class of these walls or the walls of any particular locality from other walls of the same kind. If by this term Pelasgic it is meant to assert that all such walls are really of Pelasgic origin, this is more than can be proved or presumed. In most instances, however, the Etruscans appear to have used rectangular stones, ranged in horizontal layers, and uniformly without any cement. For more complete information of what is known of Etruscan architecture, we must refer to Micali, ch. xxv., Inghirami's *text* and *plates, Series* IV., and Orioli, *Dei Sepolcrali Edifizi dell' Etruria Media*, also quoted by Inghirami.

ETRUSCANS. [ETRURIA.]

ETSCH. [ADIGE.]

ETYMOLOGY. [LANGUAGE.]

ETYMOLO'GICUM MAGNUM (τὸ μέγα ἐτυμολογικόν), an important vocabulary of the Greek language, of which the author is unknown. Some suppose it was written by a grammarian of the name of Magnus. The idea that it was compiled by Marcus Musurus, the first editor, or the Calliergi, is disproved by the fact that this dictionary is referred to by Eustathius. Sylburg considers it as old as the tenth century: much older it certainly was not; for Theognotus, a writer of the ninth century, is quoted in it. The derivations in this work, like most of those attempted by the Greeks themselves, are based upon no principle, and though in some instances accidentally right, they are generally full of the wildest absurdities, as one might expect from the author being confined to mere guess-work. It is valuable however for containing a great many traditions with regard to the meanings of old or uncommon words, and it often enables the scholar to correct the errors of the corrupt but inestimable lexicon of Hesychius. The edition of Sylburg (1594) is very useful, and has an admirable index: the edition of the Etymologicum Magnum, by Schäfer, Lips., 1816, is a reprint of Sylburg's edition. The edition by Sturz, Lips., 1818, 4to., intitled Etymologicum Græcæ Linguæ Gudianum, &c., is founded on the Codex Gudianus, which is more complete than that on which the edition of Musurus and the others already enumerated are based.

EU, a town in France, in the department of Seine Inférieure, on the south-west bank of the little river Bresle, near its mouth. Eu is 91 miles in a direct line N.N.W. of Paris.

In the middle ages Eu became a strong and flourishing place: but on the threat of a descent by the English it was burnt, in 1475, by order of Louis XI., and has never recovered the blow: Dieppe and other neighbouring places profited by its downfal. Only the churches and a few houses that were overlooked escaped the general destruction. The massive ruins of the walls and towers yet remain.

Eu has several churches: the finest, that of Notre Dame, is large and of beautiful Gothic architecture. A crypt contains the monuments of the counts of Eu: these monuments were much damaged in the Revolution. A small church adjoining the High School, formerly the Jesuits' College, contains the monument of the duke of Guise, murdered at

Blois in 1588. There are two châteaux. Of one of these, built by a daughter of the duke of Penthièvre, afterwards duchess of Orléans, only half remains, the rest having been destroyed in the Revolution. The situation of the château is charming: the park has an avenue of fine beech trees. There is an hospital attended by the Sœurs de la Charité. The market-place is good. La Chaussée d'Eu is a suburb of Eu, on the opposite bank of the Bresle. Tréport, at the mouth of the river, is the port of Eu: it has a church singularly situated on the extreme verge of a lofty and almost perpendicular cliff, and a projecting doorway of beautiful Gothic architecture.

The population of Eu in 1832 was 3356, that of Tréport 2061, together 5417: the population of the respective communes was 3543 and 2267, together 5810. The population of La Chaussée d'Eu is not given in our authorities. The manufactures of Eu are linseed oil, soap, locks and other ironmongery, leather, cotton yarn, glass, sail-cloth, linen and lace. Eu serves as a mart for the corn of the department of Somme, which is imported into that of Seine Inférieure. There is a school of mutual instruction, which was established by the King of the French when duke of Orléans. There is a tribunal de commerce or court for the decision of mercantile disputes.

EUBŒA (Εὔβοια), now called Negropont, is an island of the Mediterranean, lying along the coasts of Attica and Bœotia, from which it is separated by the Euripus, a very narrow channel, over which a bridge has been thrown, connecting the island with the main-land. It is 90 miles in length in a north-west direction, and 30 miles in extreme breadth; but in one part, between Aliveri Bay and Port Petries, it is scarcely 4 miles across from shore to shore. The only towns are Egripos and Karystos; the former situated where the island approaches nearest to the main, and the latter at the southern extremity of the island, at the bottom of a bay bearing the same name.

The island generally is elevated, and contains among its mountains some of the highest in this part of Europe. Mount Delphi rises on the eastern shore to the height of 7266 feet above the sea, and its summit is scarcely ever free from snow; Elias of Karystos, at the southern extremity, is 4748 feet high; Mount Khandhili, 4200 feet, and Telethrius, 3100 feet, are both on the western shore north of Egripos. The general formation of these mountains is grey limestone, with much clay slate.

It appears from the map constructed from Captain Copeland's recent survey, that the small peninsula to the north-west, which terminates in Cape Lithada, is mountainous, and contains one elevation, Mount Lithada, which rises to the height of 2837 feet above the sea. A little south of the point where this peninsula joins the mass of the island, and on the west coast opposite to Bœotia, is Mount Telethrius, with some hot springs near its base. From Telethrius the mountains spread out north-east to Cape Amoni, the most north-eastern point of the island, and eastward to the coast, filling the northern part of the island, and containing several elevations above 2000 feet. Along the northern coast of the island, opposite to Thessaly, and stretching at the base of this mountain group, is the fertile and extensive plain of Oreos, the antient Hestiæotis. South of Telethrius there is high land, with some interruptions, along the west coast as far as Cape Politika: within these limits is Mount Khandhili, near the coast, and another mountain 2694 feet high. Between Cape Politika and Egripos, and extending several miles inland, is the fertile plain of Egripos, bounded on the north and north-east by the high mountains which extend to the eastern coast. The centre of this mountain mass is Delphi, already mentioned, and it contains several other elevations which are between 4000 and 5000 feet. Between the mountains which we have described as occupying the north part of the island and the mass of which Delphi is the centre is the small plain of Mandhoudi on the east coast of the island. South of the narrow channel on which Egripos is situated there is a tract of low land along the Bay of Vathia, backed by the range of Mount Vathia (3821 feet), which appears to be separated by a depression from the group of Delphi, and forms part of the south-east boundary of the plain of Egripos. Farther south and near the west coast there is also the plain of Aliveri. The rest of the island south of Aliveri, along the west coast, and the whole of the eastern coast from the plain of Mandhoudi, appears to be mountainous. The southern extremity of the island is filled by the mass of Mount Elias (4748 feet), which presents to the Archipelago an iron-bound and dangerous coast.

To the southward the plains are generally cultivated with corn and olives, but those to the northward, called the Plains of Oreos, are more particularly devoted to the vine, from which a light red wine is made, which is the common beverage of the Greeks, and forms a staple article of trade. The wine is kept in pig-skins, well coated with resin, which communicates its unpleasant flavour to the contents, which otherwise would not be unpalatable. A deleterious ardent spirit is distilled from the husks of the grapes. Cotton is also planted more to the northward.

On the shores of the Bay of Oreos are some ruins on an eminence, apparently only a military post; a few huts now surround its base, but about two miles in the interior is a large village called Xero Chori, or dry village.

The island is not populous: it is conjectured to contain between 60,000 and 70,000 inhabitants, nearly all Greeks. The villages are few, and, as is the case every where in the Archipelago, built at some distance from the beach, generally on an elevation difficult of access. This precaution has been taken on account of the numerous depredations of the pirates, who were accustomed to land, sack a village, and embark before morning, so that unless the place were tolerably large and populous, there was no safety for life or property.

The passage between Thessaly and Eubœa, called the Trikiri Channel, from the town of that name at the eastern entrance to the Gulf of Volo, is about 4 miles in average width; the narrowest part, which is towards the western extreme, is not quite 1½ mile; the depth of water is regular, steep from both shores, and decreasing gradually from about 50 fathoms at the entrance to 30 towards the western end of the Negropont, off which lie some small rocky islands called Lithada Islands. Passing those islands, and turning to the southward, is the Gulf of Talanda, so called from the town of that name on the Bœotian shore. A remarkable feature in this part of the channel is the amazing depth of water under Mount Telethrius, where, for about 12 or 15 miles, there is no bottom with 220 fathoms within half a mile of the shore; but from this point the water shoals gradually towards Egripos. Towards the north-west extremity of this shore there is a very safe and excellent harbour, now called Port Ghialtra (formerly Port Kalos). There are two villages on its shores, Ghialtra to the westward, and Elypsos to the eastward: near the latter are some antient remains and beautifully sculptured fragments of white marble.

At Cape Therma, the eastern point of the bay, there are hot springs (already mentioned) of the same kind as, but more abundant than, those of Thermopylæ. The water rushes down in a copious stream into the sea, the vapour from which is visible for a considerable distance. Between this point and Egripos there are only three villages, Orovies, Glim, and Politika, all small; but at each of them there are Venetian remains.

In the southern part of the channel there are many islands along the Eubœan shore, which offer good anchorage, more especially among the Petalion Islands, which abound in rabbits, but possess only one spring of fresh water. From Egripos to Karystos there are only two villages, Aliveri and Stura, in the bays called respectively from their names. The bed of this part of the channel is level, but compared with the northern part it is shallow; the general depth is from 35 to 40 fathoms.

The eastern side of Eubœa is a continuation of rocky coast, the high land descending precipitously to the shore with few interruptions of level ground, and this only, as already mentioned, towards the northern part of the island. In the bight between Capes Doro and Octonia, it is an unbroken line of precipitous shore, in which it is scarcely possible to find a ravine sufficiently wide to haul a boat up. Fragments of wreck are found at the height of eighty feet perpendicular, washed up by the heavy sea which a north-east wind throws into this bay. These winds, which always blow very strong, are called by the Greeks 'meltem,' probably a corruption of 'mal tiempo.' In addition to this, the Dardanelles current, preserving the course communicated to it by the direction of that strait, sets strong to the south-west into this bay, and renders it a most dangerous coast: no vessel once embayed here can escape destruction. The current being deflected to the southward sweeps round Cape Doro, frequently at the rate of three miles an hour

Port Petries is the only refuge which this coast offers, and so little has hitherto been known of this shore that even this shelter has only recently been discovered. The village of Koumi, in the bay of that name, is populous, and being celebrated for its wine, has considerable trade in that article by the small caïques, which however are always obliged to be hauled up on the beach for safety. Along the whole extent of this coast, which is upwards of 100 miles, there are only five or six villages near the shore.

The small number of Turks resident in Eubœa left the island on its being surrendered for the purpose of forming an integral part of the Greek kingdom, of which it will not be the least valuable portion. The mountains are said to contain copper, and the marble quarries near Karystos have long been famous. (Strabo, p. 446.) The soil, favoured by the diversities of climate which such a variety of elevation affords, is capable of yielding the productions of tropical as well as of more northern regions, and of supporting an infinitely larger population than now occupies the land. The island abounds in sheep of an excellent breed; but bullocks are scarce, and bred principally for agricultural purposes. In the mountains are abundance of wild boar and deer, and the plains are overrun with hares and rabbits. Among the trees are the olive, oak, fir, chestnut, walnut, mulberry, and oriental plane. In the whole island there is not a stream deserving the name of a river into which the smallest boat could enter, and the inhabitants generally supply themselves with water from wells.

On the summit of Mount Elias (the Oche of Strabo) are the remains of an antient temple, consisting of rude unornamented blocks of limestone, and columns of the same material.

The town of Egripos, the antient Chalcis, the chief town in the island, is in 38° 26′ N. lat., and 23° 37′ E. long., at that part of the island where it is separated from the coast of Bœotia by a narrow channel of only forty yards. It is a walled town, and further defended, where the walls are not washed by the Euripus, by a deep and wide dry ditch. The walls are turreted, slight, and built without regularity, and the numerous winged lions of St. Mark leave no doubt of their Venetian origin. The area enclosed is about 800 yards in length by about 500 in width, which was formerly inhabited exclusively by the Turks; the streets are very narrow, but the houses capacious. The town has several gates constructed with great intricacy; that leading over the Euripus is particularly tortuous, and well defended; the drawbridges have been replaced by frail fixed bridges of logs, to the great peril of passengers.

Another defence is the fort Karababa, on the main, which stands on an eminence about 130 feet high, commencing its rise immediately from the bridge; this may be deemed the citadel of the place, as it overlooks and commands the town. It is a very misshapen structure, of an oblong form, about 400 yards long, and 150 broad. The walls are in some places so low, that an active man might vault on them; they are similar to and coeval with the walls of the town.

Outside the town to the north is a suburb appropriated to trade, and inhabited (when the writer of this article visited the place) by the Greeks and Jews. It consists of one main street about 300 yards in length, from which minor streets branch off. The houses are very small, and the shops are chiefly coffee-houses, or contain general stores and articles of dress: the whole is enclosed in a stockade. There is no commerce except in supplies of fruit and vegetables, principally from Volo, distant about ninety miles to the north, which is all carried on in small boats. The surrounding country is flat and rich, but poorly cultivated. A subsoil of stiff clay offers materials for brick-making and potteries, which are already commenced on a small scale. The market is well supplied, especially with fish; beef is difficult to be procured, but mutton very plentiful; water is scarce, and procured chiefly from wells.

There are facilities for building vessels of large size, as the shore goes off suddenly into deep water; but the inhabitants have advanced no farther yet than the repairs, clumsily executed, of their small boats, which are built generally at some of the Greek islands. The forests on Mount Delphi of fir and oak (the latter of an inferior quality) would supply wood, which might with facility be brought to the town.

Immediately opposite Egripos the land rises suddenly to hills of considerable height, beyond which lie the plains of Thebes, which town is distant about 4 hours, or 12 miles.

The breadth of the Euripus is diminished by a rock in mid-channel, on which a fort is built, dividing it into two channels: that towards the main, though rather the broader, is only practicable for small boats, as there is not more than three feet water at any time. Between the rock and the walls of Egripos is a distance of 33 feet, and the least depth at the highest water is 7 feet. It is here that the extraordinary tides take place for which the Euripus was formerly so noted: at times the water runs as much as eight miles an hour, with a fall under the bridge of about 1½ feet: but what is most singular, is the fact that vessels lying 150 yards from the bridge are not in the least affected by this rapid. It remains but a short time in a quiescent state, changing its direction in a few minutes, and almost immediately resuming its velocity, which is generally from four to five miles an hour either way, its greatest rapidity being however always to the southward. The results of three months' observation, in which the above phænomena were noted, afforded no sufficient data for reducing them to any regularity.

The port to the northward of the bridge, though not capacious, is secure: four or five frigates might moor in it, and it would contain many sail of merchantmen. It is about three-fourths of a mile in depth, decreasing in width from half a mile to the bridge, towards which the water shoals gradually from eleven and twelve fathoms, with a muddy bottom: outside is a good roadstead, with excellent holding-ground. The entrance is clear and free from danger, and although open to the Gulf of Talanda, there is never any sea of consequence; but the gusts which come down off Mount Khandhili are very heavy.

To the southward of the bridge there are two ports; the inner is supposed to be the Port Aulis, where the Grecian fleet assembled previous to the Trojan war. It is about a mile across each way, with six fathoms generally all over it, but a bank of 14 feet in the strait which communicates with the outer port confines its access to vessels of that draught of water. The outer port, which is two and a half miles long and one broad, is joined to Port Aulis by a channel nearly half a mile in length and 400 yards broad, but its outlet to the southward is narrow and intricate. Opposite Egripo Island water may be procured for shipping, though it is not always good or plentiful: the quantity of vegetable substance in the pools which are formed previous to its flowing into the sea renders it frequently unwholesome. A round tower on the eastern point, called the Bourg, is a good mark for the entrance of this port from the southward.

In and about Egripos fragments of antiquity may be seen forming parts of the walls of houses, in common with the grosser materials, like diamonds set in lead. They are generally of white marble, beautifully chiselled; but in no place can any building be traced, or vestiges of walls. The pieces of columns are generally of the Corinthian order, fluted. On Egripo Island there is the appearance of a rude wall traversing the island; and on the mainland, at the southern shore of the channel, between the two ports, where the land rises to about 400 feet, are the remains of Cyclopean walls of very high antiquity. The blocks of stone, which are very massive, rude, and irregular, but fitting closely, are of limestone, and in construction the walls resemble those of Mycenæ. This is most probably the antient Aulis; though there may have been houses at a less elevation and nearer the shore more convenient for commerce, the ascent to these ruins being steep and difficult. The site of Eretria in Eubœa has not been exactly discovered, but it must have been near the west coast and south of Chalcis





Coin of Eretria.

British Museum. Actual size. Silver. Weight $86\frac{5}{10}$ grains.

The country around Egripos is flat for many miles, and very prettily studded with kiosks and small villages. An aqueduct which, commencing at the foot of Mount Delphi,

winds its way to within half a mile of the town, forms a very picturesque object. Though it no longer conveys water, it is by no means in a ruinous condition. It appears to be of Venetian construction, and there are several ruins of that age in the neighbourhood; one especially, called Kastro, situated on the apex of an insulated rise, and presenting towards the sea a steep cliff, resembles the baronial castles on the banks of the Rhine.

Egripos is capable of vast improvements, and of becoming of great commercial importance. Little expense would render the passage of the bridge practicable for vessels of 300 and 400 tons, should it be required, thereby avoiding the passage along the outer coast of the Negropont, which is the worst in the Archipelago, as the Dardanelles current sets on its iron-bound coast, which offers no port whatever, and is a lee-shore in the strong and prevailing north-east winds.

From Egripos there is a carriage road to Karystos, at the southern extremity of the island.

History of Eubœa.—The first inhabitants of this island were probably a Pelasgic race, which is said to have occupied, before the historical times, most of the islands of the Ægean Sea. The Dryopes from Mount Œta were said to have founded Carystus and Styra (Herodotus, viii. 46; Thucyd. vii. 57); and the Athenians founded Chalcis and Eretria, before the siege of Troy. Homer (*Iliad*, ii. 536) calls the inhabitants of Eubœa by the name Abantes, and mentions them as having taken a distinguished part in the expedition against Troy. The Hestiæots were said to be a colony of the Perrhœbi, a Pelasgic tribe: but the Athenians appear to have been from a very remote epoch the principal colonizers of Eubœa. At the dawn of the historical times we find Chalcis and Eretria, two independent but allied towns, which had advanced to a high state of prosperity, holding dominion over the islands of Andros, Tenos, and Ceos, and sending colonies to the coasts of Macedonia and Thrace, as well as to the shores of Italy and Sicily. Naxus, the first Greek settlement in Sicily, and Cuma, one of the oldest in Italy, were colonies of Chalcis. Eretria and Chalcis however quarrelled, and Thucydides (i. 15) mentions the war between the two states as one of the oldest wars on record among the Greeks. This war however was not one of extermination; and we find in the sixth century B.C. the two communities still flourishing, under the government of their Hippobotæ, or wealthier citizens. Unfortunately for them, they co-operated with Cleomenes in his invasion of Attica, which followed the expulsion of the Pisistratidæ, in consequence of which, after the Athenians had repulsed Cleomenes, they invaded Eubœa, about 506 B.C., defeated the Bœotians, who had come to the assistance of Chalcis; and having taken the latter city, they punished it severely, put many of the citizens in fetters, until they ransomed themselves, confiscated all the property of the Hippobotæ, and gave their lands to Athenian colonists, whom they sent over to the island to the number of 4000 (Herodotus, v. 77). Eubœa now became in great measure a dependency of Athens. Afterwards, the Eubœans, together with the Athenians, sent assistance to the Ionians of Asia in their war against Darius Hystaspes; and their troops were among those which burnt Sardes (499 B.C.). The first invasion of Greece was the consequence of that expedition. The Satraps, Datis and Artaphernes, landed in Eubœa with an immense force, completely destroyed Eretria, and sent its inhabitants as slaves into Asia. The Persians then crossed over into Attica, where they were defeated at the battle of Marathon. In the subsequent expedition of Xerxes, Chalcis and other towns of Eubœa manned ships, which, uniting with the rest of the Greek fleet, fought with the Persians at Artemisium. The Hestiæots alone favoured the Persians. After the end of the Persian war we find the Athenians under Cimon, the son of Miltiades, making war in Eubœa against the Carystians, who had revolted, and reducing them to subjection. A general revolt of Eubœa against Athens broke out in 445 B.C., but Pericles, with 5000 regular troops, marched into the island, and recovered possession of it: the towns of Eubœa were reduced to the condition of tributaries to Athens, and an Athenian colony was settled at Oreus in the territory of the Hestiæots, which was the fertile plain on the north coast of the island. This island was of great importance to the Athenians; it furnished them with corn, supplied them with horses, and was considered of more value to them than all their other colonies put together. During the Peloponnesian war, after the defeat of the Athenians in Sicily, another general revol of Eubœa took place, and the island placed itself under the protection of Lacedæmon, but afterwards returned to the Athenian allegiance, when Athens had recovered its independence; and from that time its four principal towns, Chalcis, Eretria (which had been rebuilt near the site of the old town destroyed by the Persians), Carystus, and Oreus, possessed a kind of municipal independence under the supremacy of Athens, which supremacy was at times disputed by the Thebans, who were at last obliged to leave the island. The Eubœans however joined the Theban league against the Spartans, and fought under Epaminondas. In the general prostration into which the principal states of Greece fell after the death of Epaminondas, Eubœa seems to have been left in great measure to itself. Its principal towns came under the rule of chiefs, or tyrants, as they were called, without any interference on the part of the Athenians. About 350 B.C. Callias and Taurosthenes, sons of the late tyrant Mnesarchus, who were ruling in Chalcis, made overtures to Philip of Macedon, in order to have his assistance in subduing the rest of the island, an opportunity which was eagerly seized by Philip. Plutarch, who was at the same time tyrant of Eretria, applied to the Athenians to check Philip's interference. The Athenians sent an expedition under Phocian, who defeated the Chalcidians after hard fighting; but this led to no favourable result, as Callias remained in possession of Chalcis, and the Macedonian influence was established over the island. While Alexander was absent in his Persian wars, the Chalcidians increased and improved their fortifications, which extended to the main-land over the bridge they had built across the Euripus. When the Romans began to extend their influence to Greece, Chalcis and the other towns of Eubœa contracted alliance with Rome, and they remained steadfast to that alliance during the Ætolian war. (Livy, xxxv. 37. 39.) Chalcis afterwards submitted to Antiochus. (Livy, xxxv. 50, 51.) In the Achæan war, after the defeat at Corinth, Chalcis was taken and destroyed by the Romans, and the whole island fell under the dominion of Rome. It then gradually declined in population and importance; and Pausanias and Dion speak of its fallen state under the emperors.

In the dismemberment of the eastern empire by the Latins or Franks the Venetians obtained possession of Eubœa, which they called Negropont, a barbarous name, probably derived from the town of Egripos, a corruption of Euripus, built on the ruins of Chalcis, and from the word 'ponte,' meaning the bridge which united it to the main land. The Venetians lost the island in 1470, when the Turks took the capital, Negropont, and massacred all the inhabitants. The Venetian doge and general Morosini blockaded it in 1688, but after a murderous siege he was obliged to re-embark with great loss. The people of Eubœa took part in the last revolt of the Greeks against the Turks, and the island now forms part of the new kingdom of Greece.





Coin of Eubœa.

British Museum. Actual size. Silver. Weight 61$\frac{6}{10}$ grains.

EUCALY'PTUS, a genus of New Holland plants, consisting of lofty trees, with a volatile aromatic oily secretion in their leaves and a large quantity of astringent resinous matter in their bark. They belong to the alternate-leaved division of Myrtaceæ, and are generically known among those plants by their corolla being absent, and the limb of their calyx consolidated into a hemispherical or conical cap, which is thrown off when the stamens expand.

This genus occurs in the Malayan Archipelago, but is chiefly Australian, and, together with the leafless Acacias, gives a most remarkable character to the scenery. The species exist in great profusion, and form the largest trees in the forests of that part of the world. A modern writer upon the plants of Van Diemen's Land says that Eucalyptus seems as if it had taken undisturbed possession of those Australian regions, clothing as it does with a stupendous mantle the surface both of Van Diemen's

Land and New Holland, while the intermixture of other plants which this lordly tribe permits is, compared with its own great extent, but small and partial. Wherever you go, one species or other is constantly before you.

No trees in the world so constantly or rapidly arrive at gigantic dimensions: they often become hollow, and are then used by the traveller as roomy places of shelter at night. Frazer found a hollow Eucalyptus at Moreton Bay, used by the natives as a cemetery. Even at Swan River, where, according to the report of Frazer, the species are stunted, they also attain a huge size, as is proved by what that traveller says of the Angophoras, which he terms 'magnificent' and 'gigantic,' and which, in fact, are Eucalyptus calophylla. A height of 150 ft., and a girth of from 25 to 50 are not uncommon dimensions of these trees. Their timber is represented as highly useful for domestic and other purposes; being so soft at first as to render the felling, splitting, and sawing up of the tree when green a very easy process, and when thorougly dry becoming as hard as oak. Their bark is often extremely hard, whence some species, especially E. resinifera, are called iron-bark trees by the colonists. The blue gum-tree and some others have the singular property of throwing it off in white or grey longitudinal strips or ribands, which, hanging down from the branches, have a singular effect in the woods.

In many species the leaves are so variable in their form and other characters at different ages of the tree, or in different situations, that it is a matter of difficulty to know how they are to be botanically distinguished from each other; and in fact the subject of the distinction of species has hardly yet been taken up, no botanist feeling competent to undertake the task without some personal acquaintance with the plants in a native state. The leaves, instead of presenting one of their surfaces to the sky and the other to the earth, as is the case with the trees of Europe, are often arranged with their faces vertical, so that each side is equally exposed to light.

Gum-tree is the universal name among the colonists for a Eucalyptus, and has arisen from the large quantity of an astringent gum-like juice, resembling gum Kino in its qualities, which all the species yield. In cutting down E. robusta, Mr. Backhouse says that 'we often find large cavities between the annual concentric circles of the trunk, filled with a most beautiful red or rich vermilion-coloured liquid gum, which flows out as soon as the saw has afforded it an opening. The gum yielded by E. resinifera is considered by druggists as not in the least inferior to the Kino which the Pterocarpus or Red Saunders wood of India produces.' (*Companion to the Botan. Magazine*, vol. i. p. 69.) At Moreton Bay and in Van Diemen's Land a kind of manna is yielded by certain species. It appears in the form of an exudation, which coagulates and drops from the leaves to the ground in small white particles, often as large as an almond, and with a sweet agreeable taste.

Upon the whole this genus must be considered the most important that New Holland produces. As it occurs so far to the south as Van Diemen's Land, it is almost certain that it might be naturalized in Devonshire, Cornwall, and on the west of Ireland. Even in the neighbourhood of London certain kinds bear moderate winters without shelter, especially E. pulverulenta.

It is very much to be regretted that some settled nomenclature is not introduced, for the colonists apply the same names to different species in different parts of the country; this renders it difficult to tell of what they are speaking. As far as we can collect the evidence, it appears that the following are, or should be, the botanical species to which the colonial names belong:—

Blue Gum of Port Jackson	E. piperita
Ditto of Hobart Town	E. globulus
Stringy Bark . .	E. robusta
Iron Bark . .	E. resinifera
Kino Gum . .	Ditto
Peppermint Tree . .	E. piperita
Weeping Gum of Van Diemen's Land . .	Uncertain
Mountain Blue Gum of ditto	Ditto
Black Gum of ditto	Ditto
Black-budded Gum of ditto	Ditto
Cider Tree of ditto	Ditto
Manna Gum of ditto	Ditto
Ditto of Moreton Bay .	E. Manna, *Cunn.*
Blood-wood of Port Jackson .	E. corymbosa
White Gum of Van Diemen's Land	E. resinifera
Ditto of Moreton Bay	E. subulata, *Cunn.*
Ditto of the S.W. Interior	E. Leucadendron, *Cunn.*

EU'CHARIS. [BERÖE, vol. iv., p. 318; CILIOGRADA, vol. vii., p. 165.]

EUCHARIST (εὐχαριστία, thanksgiving) is a Greek name of the Christian sacramental act otherwise called the Communion, or the Lord's Supper; and, in contradistinction from these appellations, it particularly expresses the idea of thankfully commemorating the mediatorial sacrifice of Christ; or, according to others, the name was assigned in reference to the fact that, when Jesus enjoined the observance of the rite, he gave thanks.

An elaborate account of the history and doctrines of the Eucharist is given in the learned dissertations on the subject by bishop Patrick, Dr. Waterland, and numerous other writers, of whom a list is furnished in Watt's *Bibliotheca Britannica.* (Cave's *Primitive Christianity*, part ii., c. 11; Bingham's *Origines Ecclesiasticæ;* Claude, *On the Eucharist*, fol., 1684; *Traité de la Cène du Seigneur*, fol., 1635; *Traité de l'Euchariste*, par Cardinal du Perron, fol., 1633.) [COMMUNION.]

EUCHYSIDERITE (*Achmite*), a mineral which occurs crystallized. Primary form, an oblique rhombic prism, of same cleavage and measurements as pyroxene. Colour brownish-black. Lustre vitreous. Nearly opaque. Sp. gr. 3·34. Hardness 6·0,6·5. Streak, yellowish-grey. Fracture, imperfect conchoidal.

It occurs in Norway. Before the blow-pipe alone, readily fuses into a brilliant black globule; with borax forms a coloured glass.

According to Berzelius it consists of—

Silica . . .	55.25
Oxide of iron . .	31.25
Soda . . .	10.40
Lime . . .	0.72
Oxide of manganese	1.08
	99.70

EUCLASE, a crystalled mineral, the primary form of which is an oblique rhombic prism. It is either colourless and nearly transparent, blue, or pale bluish-green; it refracts doubly; the lustre is vitreous. Hardness 7·5; sp. gr. 3·098. Cleavage very distinct, parallel to the oblique diagonal, but indistinct parallel to the terminal plane and horizontal diagonal. The fracture is uneven, and the streak white.

It was first found in Peru, but has since been met with in detached crystals in alluvial ground in Brazil.

According to Berzelius it consists of—

Glucina . .	21.78
Silica . . .	43.32
Alumina . .	30.56
Oxide of Iron .	2.22
Oxide of Tin .	0.70
	99.58

EUCLID, the Geometrician. [GEOMETRY OF THE GREEKS.]

EUCLID (Εὐκλείδης) of Megara is said to be a different person from the geometrician of the same name. He was a scholar of Socrates, and the founder of the school called the Megaric, which may be considered as the predecessor of the Sceptical school of a later date. This school was distinguished by its dialectic subtlety, by which contradictory propositions could be proved, the consequence of which was universal doubt. The Supreme Good, according to Euclid, was always the same and unchangeable. He wrote six dialogues, which are lost. (See *De Megaricorum Doctrina ejusque apud Platonem et Aristotelem vestigiis*, Ferd. Deycks, Bonn, 1827, 8vo.)

EUCŒ'LIUM. (Zoology.) [SYNOICUM.]

EUCRA'TEA. [CELLARICEA, vol. vi., p. 405.]

EU'DEA. [SPONGIDÆ.]

EUDIO'METER, an instrument invented by Dr. Priestley, and originally employed by him in ascertaining the goodness of atmospheric air obtained from various places and under different circumstances. By the use of this instrument and the modifications which it has received, it has been ascertained that the air is liable to no essential variation of composition except such as arises from local and temporary causes.

The use of the eudiometer, termed eudiometry, has, since its original contrivance, been extended to all gaseous mixtures, but especially to determining the quantity of oxygen which they contain when resulting from the operations of analysis; and it is an essential instrument in the chemical

investigation of bodies, not merely such as are naturally gaseous, but which become so by the changes to which they are subjected during chemical research.

The principle upon which the use of the eudiometer depends, so far as atmospheric air and oxygen gas are concerned, is that of exposing them to the action of some substance, whether solid, fluid, or gaseous, which, on account of its affinity for oxygen, combines with it and leaves the gases with which it is mixed unacted upon.

The eudiometer invented by Dr. Priestley arose from and was connected with his great discovery of oxygen gas and the fact which he ascertained of its absorption by another gas, which he called nitrous air, since called by various other names, as nitrous gas, deutoxide of azote, binoxide of nitrogen, and nitric oxide gas.

This gas may be considered as nitric acid deprived of a large portion of its oxygen, which is effected by dissolving a metal in it, as, for example, copper, silver, or mercury, &c.; and of these the last mentioned is said to yield the gas in the greatest purity. The nitric oxide thus obtained being disposed to regain the oxygen which the metal has taken from it, absorbs it with great facility from all such gaseous mixtures as contain it; the evidences of its action are the formation of a red vapour, condensation of volume, and the reproduction of nitric acid; and the quantity of oxygen absorbed is determined by the degree of condensation which is produced by its action.

Dr. Priestley's method was extremely simple: he took a phial capable of holding about an ounce of water, filled it with water, and displaced it with atmospheric air, or with the gaseous mixture to be examined; the volume of this being noted, it was transferred, over water, into an air-jar about an inch and a half in diameter. An equal volume of nitric oxide was added to it, and they remained together for about two minutes: if the diminution was very considerable, another volume of nitric oxide was added. When this part of the process was over, the gas was transferred to a glass tube about two feet long, one-third of an inch in diameter, and graduated into 10ths and 100ths. After noting the volume of the gas, the result was expressed in measures and decimal parts; thus, when equal volumes of common air and nitric oxide were mixed, and they afterwards occupied the space of one volume and two-tenths, Dr. Priestley, in speaking of the air so tried, said the measures of the test were 1·2, or the standard of the air was 1·2.

Although Dr. Priestley determined the volumes of oxygen and nitric oxide required for mutual saturation, he appears mostly, if not entirely, to have confined his eudiometrical operations to comparing the results of them with those on atmospheric air; consequently, although what he calls *the standard* was learnt by his process, the exact quantity of oxygen which the mixture contained was not determined by it.

Numerous attempts have been made by chemical philosophers of the greatest eminence to render the eudiometrical application exact and certain, and if this could be effected, it would be rendered an extremely valuable method on account of the rapidity of its action. Omitting however all notice of the modifications which have been proposed by Cavendish, Fontana, Ingenhouz, Sardinani, &c., we may observe, that while both Dalton and Gay-Lussac imagined that they had removed the uncertainty of the process, the late Dr. Henry admits that he placed but little reliance upon it, and Dr. Thomson states that he has abandoned it altogether, excepting as far as it serves to indicate the presence or absence of oxygen gas in a gaseous residue under examination.

A very different and certainly an improved method, though rather an operose one, of employing nitric oxide was adopted by Davy. Dr. Priestley discovered that a solution of sulphate of iron is capable of dissolving nitric oxide gas, and that in this state it retains its power of combining with and condensing oxygen gas. It is prepared by passing the nitric oxide through the solution of sulphate; as the gas is absorbed the solution becomes of a deep olive brown, and when the impregnation is completed it appears opaque and almost black.

The instruments necessary for ascertaining the composition of the atmosphere by means of this solution consist simply of a small graduated tube divided into 100 parts, and greatest at the open end, and of a vessel for containing the fluid.

The tube, after being filled with the gaseous mixture to be examined, is introduced into the solution, and that the action may be more rapid, gently moved from a perpendicular towards a horizontal position. Under these circumstances the gas is rapidly diminished; and in consequence of the dark colour of the fluid, it is very easy to observe the degree of absorption; in a few seconds the experiment is completed, and the whole of the oxygen is condensed.

The period of the greatest diminution is to be accurately noted; for shortly after this it begins gradually to increase. Davy states that the impregnated muriate of iron (chloride) acts more rapidly than the sulphate.

It is to be observed that this process is not applicable merely to the analysis of the air. It was employed by Allen and Pepys in their laborious and accurate experiments on respiration; and they added a simple solution of sulphate of iron to the residual gas, evidently for the purpose of separating any nitric oxide gas which might have escaped from the solution after arriving at the point of greatest condensation.

The eudiometer next to be mentioned is that invented by Scheele, which was probably the first proposed after Dr. Priestley's. This was a graduated glass tube containing a certain volume of air, which was exposed to a mixture of sulphur and iron-filings made into a paste with water. Although the oxygen was absorbed and the azote left by this operation, yet the process was not to be relied upon, for, by the formation of sulphuric acid, which occurred by the oxidizement of the sulphur, the iron was acted upon, and water being decomposed, its hydrogen was evolved, and interfered with the results of the operation.

This plan, however imperfect, had the merit of simplicity, for the quantity of oxygen absorbed was determined at once by deducting the volume of the residual gas from that of the whole quantity submitted to experiment.

De Marté, instead of using sulphur and iron, employed a solution of sulphuret of potassium prepared by dissolving sulphur in a solution of potash. It is stated that this solution when newly prepared absorbs a small portion of azotic gas; but the fallacy arising from this source is readily obviated by agitating the solution for a short time with a little atmospheric air previously to using it, by which it is saturated with azote. A tube divided into 100 parts and immersed in the solution is sufficient for the use of it.

Guyton employed sulphuret of potassium also in his eudiometer, but he used it in a solid state, and applied heat to expedite its action. In this case, as when the solution is used, both the sulphur and potassium are oxidized, and the result is sulphate of potash. It has been objected, and probably with reason, to this eudiometer, that sulphuretted hydrogen was elicited by the action of the heat upon the sulphuret. A description of this eudiometer, which has been but little used, is given in *Nicholson's Journal*, 4to., vol. i.

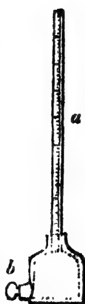
The eudiometer of Seguin is a glass tube, about an inch in diameter, eight inches long, and open at one end. It is to be filled with and inverted in mercury; a small piece of phosphorus is then put under the open end of the tube, and by its lightness it immediately rises to the top of it, where it is to be melted by the approach of a red-hot iron. A measured portion of the gas to be examined is then to be passed into the tube; the phosphorus inflames on each addition of the gas, and the mercury rises, owing to the condensation of the oxygen. When all the gas under examination has been thrown up into the tube, the hot iron is again used to ensure the completion of the process: the quantity of the residual gas is determined by transferring it into a graduated tube, and the difference between the quantity submitted to experiment and that left after it indicates that of the oxygen absorbed.

In this operation, owing to the affinity existing between the phosphorus and the oxygen, they combine and form phosphoric acid: it is however stated that the azote dissolves a small quantity of phosphorus, and that, owing to the expansion which this occasions, about $\frac{1}{40}$ of the volume of the azotic gas is to be deducted.

Berthollet also employed phosphorus in his eudiometer, but instead of heating it, as in the above-described method, he allowed combination to take place between it and the oxygen, by what is termed slow combustion. He exposed a stick of phosphorus fastened to a glass rod in a narrow graduated glass vessel, filled with air, and standing over water: the phosphorus immediately begins to act on the oxygen of the air, as shown by the formation of the white vapour of phosphoric or phosphorous acid; but this occurs without visible combustion: in six or eight hours the whole of the oxygen disappears, and its quantity is, of course,

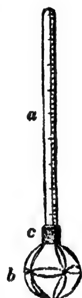
immediately apparent, making the deduction above stated from the azotic gas.

Dr. Hope's eudiometer is represented in the annexed figure. It is used with a solution either of sulphate of iron impregnated with nitric oxide or with solution of sulphuret of potassium. This eudiometer consists of a small bottle, capable of holding about three ounces, for containing the eudiometric fluid, and it is perforated and furnished with a stopper at *b*. Into the neck of the bottle a hollow graduated tube, *a*, closed at the upper end, is accurately fitted by grinding; it holds precisely a cubic inch, and is divided into 100 equal parts. To use the apparatus, the bottle is first to be filled with the solution to be employed, and covering the mouth with a flat piece of glass, it is to be immersed in water; the glass being then removed, the open end of the tube containing the gas to be examined is to be inserted.



The instrument being removed from the water, is to be inverted. The gas ascending into the bottle, it is to be brought into thorough contact with the liquid by brisk agitation, by which absorption of gas occurs; to supply its place the stopper at *b* is removed under water, a quantity of which rushes into the bottle; the stopper is then replaced, and these operations are alternately renewed, till no further diminution takes place; the tube *a* is then withdrawn, the neck of the bottle being in water, and it is held inverted for a short time, and the diminution is then measured by the graduated scale.

Dr. Henry has pointed out some difficulties attendant upon the use of this eudiometer, to obviate which he has substituted a caoutchouc bottle for the glass one, as shown in the annexed figure at *b*. The tube *a* is accurately ground into a short piece of very strong tube of wider bore, as shown at *c*, the outer surface of which is made rough by grinding, and shaped as represented, that it may more effectually retain the neck of the elastic bottle when fixed by waxed thread. This instrument is used, in every respect, in the same manner as Dr. Hope's. The only difficulty is in returning the whole of the residuary gas into the tube, but the art of doing this is readily acquired by practice.



Pepys has contrived a eudiometer, in which a caoutchouc bottle is employed as in Dr. Henry's. This instrument, from the inventor's statement, appears to be susceptible of great accuracy; for he states that he is able to measure an absorption of only $\frac{1}{1000}$ of the gas employed. For an account of this eudiometer, and of some experiments performed with it, see *Phil. Trans.*, 1807. The parts are too numerous for us to insert figures of, and without them a description would be scarcely intelligible.

Having now described the use of nitric oxide, sulphuret of potassium, and phosphorus, as eudiometrical substances, and noticed the more important instruments in which they are employed, we shall notice the eudiometer of Volta, and the eudiometric body which he made use of.



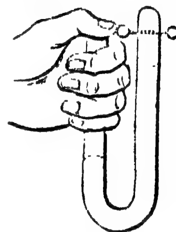
Volta's method of determining the composition of atmospheric air, or of the quantity of oxygen contained in gaseous mixtures, is by means of combustion with a known volume of hydrogen gas; for it having been ascertained that when a mixture of oxygen and hydrogen gases is fired, one-third of the diminution is owing to the condensation of oxygen, we have only to observe the measure of the contraction of volume to ascertain that of the oxygen which was present. Of Volta's eudiometer various modifications have been proposed, all agreeing however in the principle above mentioned. According to Berzelius, that invented by Mitscherlich is to be preferred, on account of the simplicity of its construction and the accuracy of its results. We shall therefore describe it instead of the original one, and it will at once occur to the chemical reader that it is a slight modification of Priestley's and Cavendish's detonating tubes.

This instrument, as represented by the annexed figure, consists of a very thick glass tube from 18 to 24 inches long, and about four lines internal diameter; it is graduated, open at one end, and closed at the other. Near the top A the tube is perforated with platinum wires, placed at such a distance as readily to allow of the passage of the electric spark between them, and externally hooked; near the orifice, B, the tube is laterally perforated and furnished with a glass cock, which is shut after filling the tube with the gas to be examined: this is, of course, to prevent the loss of gas by the expansion accompanying the detonation by the spark. When this is over, the cock is turned under either water or mercury, and the fluid rising in the tube, the condensation is exactly noted by bringing the fluid within and without the tube to the same level.



Another variety of Volta's eudiometer is represented by the opposite figure. It is more simple in its construction than the foregoing, but less certain in its results, on account of the escape of gas which occurs if it be not immersed sufficiently deep in water or mercury: it is a modification of an instrument invented by Dr. Priestley. The only additional explanation required is, that A is a moveable metallic wire with a knob at the end, which is raised near enough to the knob at the top of the instrument to allow of the passage of the electrical spark.

Dr. Ure has also contrived a modification of Volta's eudiometer, which renders the experiment easy of performance by a single person. This instrument is shown by the figure. It consists of a glass siphon, having an interior diameter of from 2-10ths to 4-10ths of an inch; its legs are nearly of equal length, each being from six to nine inches long. The open extremity is slightly funnel-shaped; the other is hermetically sealed, and has two platinum wires inserted; the legs are about one-fourth to one-half an inch asunder. The instrument having been graduated, it is to be filled with water or mercury, and the gas transferred into it in the ordinary manner; then being upright, part of the fluid in the open leg is displaced by inserting a glass rod, or in some other manner. The open leg ought to contain at least two inches of air between the thumb and the mercury: this atmospheric column serves as a recoil-spring, enabling the operator to explode considerable quantities without inconvenience or danger. The open leg being grasped by the hand, the thumb is to be placed lightly over the aperture, so as to close it, and at the same time to touch one of the wires; a spark taken from the conductor to the other wire passes through the gas, inflaming it, and is conducted off by the thumb and hand. The gas in expanding depresses the fluid beneath it, whilst, as already noticed, the air in the part inclosed by the thumb acts as a spring to restrain the violence of the explosion. If a charge from a jar is to be passed, then the thumb must not be allowed to touch the wire whilst closing the aperture. When the jar is charged, the wire connected with the outer coating is first to be hooked upon the eudiometer wire nearest the thumb, and securely retained there, so as not to slip during the experiment; and then the knob of the jar is to be brought to the other wire and the gas inflamed.



After explosion, when the condensation of volume ensues, the thumb will feel pressed down to the orifice by the superincumbent atmosphere. On gradually sliding the finger to one side and admitting the air, the mercurial column in the sealed leg will rise more or less above that in the other; mercury is then to be poured in till the equilibrium is restored, and the resulting volume of gas is then read off.

Dr. Ure states that with the above instrument he has exploded half a cubic inch of hydrogen mixed with a quarter of a cubic inch of oxygen, as also a bulk nearly equal of an olefiant gas explosive mixture, without any unpleasant concussion or noise.

Dobereiner has suggested a eudiometrical process, founded on his curious discovery of the property which spongy platinum possesses of causing the combination of oxygen and hydrogen gases. In this eudiometer the com-

bination occurs without explosion, and yields results of great accuracy. Dobereiner found that when the spongy platinum was mixed with certain substances, so as to prevent its immediate and explosive action, it caused the oxygen and hydrogen to combine with moderate rapidity. The late Dr. Henry, who performed a most important and accurate series of experiments on this eudiometrical process, recommended a mixture of three parts of spongy platinum and two of fine china clay made into a paste with water and moulded into spherules about the size of a pea; these were fastened to a platinum wire, that they might be removed after the action was over. They should be heated and suffered to cool a short time before use: they suffer no loss of power, and possess the great advantage over the electric spark, that they act upon gaseous mixtures which contain so little oxygen and hydrogen that they cannot be fired. The late Dr. Turner ascertained that it was possible to determine the presence of $\frac{1}{100}$ of hydrogen or oxygen in a gaseous mixture; whereas, when these gases formed $\frac{1}{13}$ of a mixture, they could not be detected by electricity. The effect takes place more rapidly in large than in small tubes.

There are various gases which impede the action of the platinum balls. It appears from the experiments of Dr. Henry, that when the compound combustible gases, mixed with each other, with hydrogen, and with oxygen, are exposed to the balls of platinum, the several gases are not acted upon with equal facility; that next to hydrogen carbonic oxide is most disposed to unite with oxygen, then olefiant gas, and lastly, carburetted hydrogen.

Dr. Henry observed, that the property inherent in certain gases of retarding the action of platinum, when they are added to explosive mixtures of oxygen and hydrogen, is most remarkable in those which possess the strongest attraction for oxygen. Heat occasions the platinum balls to act in many cases in which no combination would occur without it.

In concluding this historical sketch of eudiometers and eudiometry, we repeat an observation already made, viz., that whatever volume of the mixed gases may disappear after detonation or by the action of the spongy platinum, one-third of such portion is to be considered as oxygen and two-thirds as hydrogen, the result of their combination being water, formed of these proportions of its constituent gases.

EUDO'CIA, daughter of Leontius, an Athenian sophist, was called Athenais before her baptism. She was carefully instructed by her father in literature and the sciences. After her father's death, being deprived by her brothers of all share in the inheritance, she repaired to Constantinople, and appealed to Pulcheria, sister of Theodosius II., who was so pleased with her that she induced her brother to marry her, A.D. 421. Eudocia surrounded herself with learned men; but the emperor, through jealousy, dismissed all her court, and had her exiled to Palestine, where she continued to reside after the death of her husband. She there embraced the opinions of Eutyches, and supported by her liberality and influence the monk Theodosius, who forced himself into the see of Jerusalem, after driving away Juvenal, the orthodox bishop, and kept it until he was himself driven away by order of the Emperor Marcianus. Euthymius, called the Saint, by his reasonings brought back Eudocia to the orthodox faith, after which she spent the remainder of her days at Jerusalem, where she died in 460, protesting her innocence of the guilt with which her husband had charged her. Eudocia wrote several works, of which Photius quotes a translation in verse of the first eight books of the Old Testament. There is also a work attributed to her, which was translated into Latin by Echard, and was published under the title of 'Homerici Centones Græce et Latine, interprete Echardo,' Paris, 1578. It is a life of Jesus Christ, composed of lines taken from Homer. Most critics however believe that it is not the work of Eudocia, though Ducange is of the contrary opinion.

EUDOCIA the Younger, daughter of the preceding and of Theodosius II., married Valentinianus III. After the assassination of her husband by Petronius Maximus, she was obliged to marry the usurper. Eudocia, out of indignation and revenge, called in Genseric, king of the Vandals, who came to Italy, plundered Rome, and carried Eudocia to Africa with him. Some years afterwards she was sent back to Constantinople, A.D. 462, where she died.

EUDOCIA, the widow of Constantinus Ducas, married Romanus Diogenes, an officer of distinction, A.D. 1068, and associated him with her on the throne. Three years after, Michael, her son, by means of a revolt, was proclaimed emperor, and caused his mother to be shut up in a convent, where she lived the rest of her life. She left a treatise on the genealogies of the gods and heroes, which displays an extensive acquaintance with the subject. It is printed in Villoison's *Anecdota Græca*, 2 vols., 4to. 1781.

EUDO'RA. [MEDUSA.]

EUDOXUS, a native of Cnidus, a city of Caria, in Asia Minor, and the son of Æschines, flourished about 370 B.C. He studied geometry under Archytas, and afterwards travelled into Egypt to study the sciences under the priests of that country. Diogenes Laertius informs us that he and Plato studied in these schools for about thirteen years; after which Eudoxus came to Athens, and opened a school of his own, which he supported with such reputation that it excited the envy even of Plato himself. Proclus informs us that Euclid very liberally borrowed from the elements of geometry composed by Eudoxus. Cicero calls Eudoxus the greatest astronomer that had ever lived; and we learn from Petronius that he retired to the top of a very high mountain that he might observe the celestial phenomena with more convenience than he could on a plain or in a crowded city. Strabo (p. 119) says that the observatory of Eudoxus was at Cnidus, from which the astronomer saw the star Canopus. Vitruvius (ix. 9) describes a sun-dial constructed by him; and Strabo (p. 390) quotes him as a distinguished mathematician. Nothing of his works remains. He died in the fifty-third year of his age. [ASTRONOMY, p. 531.]

EUDOXUS, of Cyzicus, was sent by Ptolemy VII., of Egypt, on a voyage to India about B.C. 125. (Strabo, p. 98, Casaub.) The passage of Strabo referred to contains an account of his adventures. From this Eudoxus, or another of the name, Strabo derived some materials for his great work (379. 550, &c.).

EUDYALITE, a mineral which occurs both crystallized and massive. The crystals are generally small. The primary form is a rhomboid; the colour is red or brownish-red, and the crystals are faintly translucent or opaque. Lustre vitreous, sometimes dull. Sp. gr. 2·9. Hardness 5·0, 5·5. Streak white. Fracture uneven. The massive varieties are imbedded and amorphous.

It occurs at Kandarluarsuk, in West Greenland.

Before the blow-pipe it fuses into a leek-green scoria.

According to Stromeyer it consists of—

Silica	52·47
Zirconia	10·89
Lime	10·14
Soda	13·92
Oxide of Iron	6·85
Oxide of Manganese	2·57
Muriatic acid	1·03
Water	1·80
	99·67

EUDY'NAMYS. [CUCULIDÆ, CUCULINÆ, vol. viii., pp. 206 and 211.]

EU'DYTES. [DIVERS, vol. ix., p. 37.]

EUGENE, FRANÇOIS DE SAVOIE, commonly called Prince Eugene, was paternally descended, in the third degree, from the ducal house of Savoy, but was a French subject by birth, being a younger son of the Comte de Soissons, and born at Paris, October 18, 1663. He was designed for the church, but having formed a decided preference for a military life, and being also moved by certain wrongs which he conceived to have been done to his family by Louis XIV., and which he deeply resented, he entered the service of the Emperor Leopold. From this time he renounced his allegiance to France, and long after, when his reputation was at its height, rejected the most brilliant offers made by the French government to purchase his return to the service of his native country. His first campaign was against the Turks, at the celebrated siege of Vienna in 1683. Eminent bravery and talent, joined to high birth, ensured him rapid promotion. In 1688-9, on the breaking out of war between France and the Empire, he was employed on a diplomatic mission to the duke of Savoy, and in 1691 was raised to the command of the imperial army in Piedmont. During two campaigns he maintained a decided advantage over the French: in 1693 he was less successful. The duke having returned to the French alliance, we next find Prince Eugene commanding the army in Hungary, where he won a great victory over the Turks at Zenta, on the river Theiss, Sep-

tember 11, 1697. The peace of Carlowitz (1699) closed this scene of action; but a more brilliant one was opened in 1701 by the war of the Spanish succession. During two years Eugene maintained the imperial cause in Italy with honour against superior forces commanded successively by Catinat, Villeroi, and Vendôme, against the last of whom he fought the indecisive battle of Luzara, August 1, 1702, in which the flower of his troops was destroyed. At the end of this campaign he returned to Vienna, and was appointed president of the council of war.

In 1704 he commanded the imperial troops at the battle of Blenheim, August 13, 1704. The successes of the French in Piedmont made it expedient for him to return thither in 1705. He soon restored the duke of Savoy's declining fortunes, and won the decisive battle of Turin, September 7, 1706, after which the French evacuated the country. He was thus set again at liberty to co-operate with Marlborough in 1708, and had a share in the victory of Oudenarde, and in the capture of Lille, the siege of which was entrusted to him, while Marlborough protected his operations. In 1709 he was wounded at the bloody battle of Malplaquet, of which he was the chief adviser, and in which he led the attack upon the left wing. On the death of the Emperor Joseph in 1711, he took an important part in securing the succession to his brother Charles VI., and he visited England at the end of that year, in hope of preventing the secession of England from the alliance. He was received as his services deserved, but made no progress towards his object; for the dismissal of the Whig ministry was soon followed by the congress and peace of Utrecht. The emperor being no party to that treaty, Eugene invaded France in 1712 with little advantage, and it became evident that the interests of the empire would be best consulted by peace: the preliminaries were accordingly signed at Rastadt, March 6, 1714.

In 1716 Prince Eugene again marched against the Turks, and won the battle of Peterwaradin, August 6, against an enormous disproportion of numbers. In the following year he besieged Belgrade with 40,000 men. With troops wasted by disease, pressed by an army of 150,000 men from without and opposed by a powerful garrison from within, he was in the utmost danger, when, with the happy boldness which distinguished him, he seized the right moment, and inflicted a signal defeat on the army which threatened him. Upon this the town surrendered. Peace was concluded in the following year.

He took up his residence at Vienna, honoured and trusted by the emperor, in whose political service he was much employed. In 1733 a fresh quarrel with France called him again to command the imperial army on the banks of the Rhine. This war is said to have been undertaken against his advice: at all events age had diminished his energy: he contented himself with standing on the defensive, and used his influence to effect a reconciliation. Preliminaries of peace were signed at Vienna, October 5, 1735. He died suddenly in that capital, April 21, 1736, aged 73.

As a general, Prince Eugene ranks among the first of his kind, but that kind was not of the highest order of excellence. His name is memorable for no improvements in the *art* of war, neither was he famous for skill in manœuvring or combining the operations of distinct masses upon one object. His characteristics were penetration, quickness of perception, decision, and what usually goes along with them, readiness in amending a fault when made; so that his skill lay rather in making the best of given circumstances than in bending circumstances to his will beforehand. It is said that he always took great pains to learn the character of the general opposed to him. Careless of his own person (he was thirteen times wounded in battle), he was also somewhat prodigal of his soldiers' lives. However, he threw a glory round the Austrian arms such as has never dignified them either before or since.

The best account of his exploits is 'L'Histoire du Prince Eugène,' 5 vols. 12mo., by M. de Maubillon, but published without his name. In English, there is Campbell's Military History of Prince Eugene and the Duke of Marlborough, 2 vols. fol.; and several smaller works. Prince Eugene wrote memoirs of himself, which have been published both in French and English.

EUGE'NIA, a genus of dictyledonous polypetalous plants of the natural order of Myrtaceæ; so named in honour of Prince Eugene of Savoy, who was a patron of botany and horticulture. The genus, as at present constituted, contains nearly 200 species, though numbers have been removed to the genera Nelitris, Jossinia, Myrcia, Sizygium, Caryophyllus, and Jambosa, in which are now contained the Clove tree, the Rose apple, and Jamoon of India, formerly included in Eugenia. This genus is confined to the hot and tropical parts of the world, as Brazil, the West India Islands, and Sierra Leone, and extends from the Moluccas and Ceylon to Silhet and the foot of the Himalayas in Asia.

Eugenia is characterized by having the tube of the calyx of a roundish form and the limb divided into four parts; the petals equal in number, and inserted on the calyx. The stamens are numerous. The ovary 2-3 celled, with several ovules in each. Seeds one or two, roundish and large, with the cotyledons and radicle united into one mass. In habit and inflorescence the species resemble many myrtles. Like the family to which they belong, some of the species of Eugenia secrete a warm volatile oil in their herbaceous parts; abound in tannin; yield good wood; and a few have fruit which is edible, though not very agreeable, from being impregnated with the aroma of the oil.

The most remarkable species of the genus, and one of the few which it is necessary to notice, is the Allspice, Pimento, or Bay-berry tree. This is the Eugenia Pimenta of De Candolle; the Myrtus Pimenta of Linnæus and of the London Pharmacopœia. It is a native of South America and the West India Islands, especially Jamaica, and from being cultivated there is often called Jamaica Pepper. The tree is very handsome, often 30 feet high, and much resembles the Clove tree in the form and appearance of its leaves as well as in habit. The trunk is smooth, and much branched towards the top. The older branches are round, the younger compressed, and the twigs as well as the flower-stalks pubescent; the leaves are petiolate, oblong or oval, smooth, and marked with pellucid dots, forming a dense evergreen foliage; the flower-stalks are both axillary and terminal, and are divided into three-forked panicles; the flowers are small, without show, and conformable in structure to the character of the genus. The berry is spherical and crowned with the persistent calyx; when ripe, smooth, shining, and of a dark purple colour; usually one, occasionally two-celled, containing large roundish seeds.

The Pimenta is cultivated with great care in Jamaica, and abounds especially on the hills on the north side of the island. The trees are formed into regular walks, and begin to bear when three years old, but are not in perfection until they have been planted seven years. They thrive best in rocky lands, or a rich soil having a gravelly bottom. Mr. Bryan Edwards says that a single tree has been known to yield 150 lbs. of the raw fruit, or 100 lbs. of the dried spice; but the crop is uncertain, and plenteous perhaps only once in five years. The tree has been introduced into and flourishes in the southern parts of India.

The berries, being the valuable part of the tree, require care in gathering as well as drying; the processes for which are described by Browne in his 'History of Jamaica,' p. 248. They must be picked when they have arrived at full growth, but before they begin to ripen: they are dried in the sun, on raised boarded floors, and frequently turned during the first and second day; they are then put into sheets, often winnowed, and exposed to the sun until sufficiently dried, which is known by the colour and the rattling of the seeds in the berries. Browne says, 'Such of the berries as come to full maturity do, like many other seeds, lose that aromatic warmth for which they are esteemed, and acquire a taste perfectly like that of Juniper berries, which renders them a very agreeable food for the birds, the most industrious planters of these trees.'

The leaves and bark participate in the warm aromatic properties for which the berries are celebrated, and which have received their name of Allspice from their fragrant odour being thought to resemble that of a mixture of cinnamon, cloves, and nutmeg. Their taste being warm and aromatic makes them useful as a spice in cookery, and a stimulant in medicine.

Eugenia Michelii is a Brazilian species, cultivated in Martinique, whence it is called *Cerisier de Cayenne*, as it yields a small edible fruit.

EUGENIACRINITES. [ENCRINITES, vol. ix., p. 393.] N.B. The Rev. Lansdown Guilding, in his notice of a perfect recent *Encrinus*, found in the Caribbean seas, and which, according to him, comes nearest to the *Stag's* Horn *Encrinite* of Parkinson, says that its capture has enabled him

to settle the point (which way he does not in terms state) as to whether the animal is locomotive or fixed. He gives no detailed description of the species *Encrinus? Milleri*, but speaks of the *Sessile* genera of *Crinoidea*, and says that *E. Milleri* inhabits the Caribbean sea at great depths (in profundis), adhering to *Gorgoniæ*. He describes the *abdomen* of his species as being membranaceous, and situated between the bases of the arms. (*Zool. Journ.*, vol. iv. p. 173.)

EUGENIN, a substance which deposits spontaneously from the distilled water of cloves; it crystallizes in small laminæ, which are colourless, transparent, and pearly, and in time they become yellow: the taste of eugenin is but slight, and the smell much less strong than that of the clove. It is soluble in alcohol and æther in all proportions: by the action of nitric acid, like the oil of cloves, it becomes immediately, even when cold, of a blood-red colour. It is composed of oxygen, hydrogen, and carbon, in the same proportions as constitute the oil of cloves, with one equivalent less of oxygen and hydrogen.

EUGE'NIUS I., a native of Rome, was elected by the Romans, A.D. 654, as successor to Martin I., who had been sent into banishment to the Thracian Chersonesus by order of the Emperor Constans II., who favoured the schism of the Monothelites. Martin dying in the following year, Eugenius continued in dispute with the court of Constantinople till he died in 657, and was succeeded by Vitalianus.

EUGENIUS II., a native of Rome, succeeded Paschas I., A.D. 824, in the midst of great disorder which occurred at Rome owing to the corrupt state of society and mal-administration of that city. To reform these, the emperor, Louis the Good, sent his son Lotharius to Rome, who corrected many abuses which, by the account of Eginhardt and other chroniclers, had grown to an enormous extent. He confirmed the right of electing the pope to the clergy and people of Rome, but under the condition that the pontiff elect should swear fidelity to the emperor before the imperial missus or representative. Eugenius held a council at Rome, in which, among other things, it was decreed that in every episcopal residence, as well as in every country parsonage, there should be a master for teaching the people and explaining the Scriptures. Eugenius died in 827, and was succeeded by Valentinus, who, dying also after a few weeks, was succeeded by Gregory IV.

EUGENIUS III., a native of Pisa, of the Cistertian order, and a disciple of St. Bernard, succeeded, A.D. 1145, Lucius II., who had died of a blow from a stone inflicted in a riot of the Roman people. Arnaldo da Brescia was then preaching his reform at Rome, the senate had declared itself independent of the pope, and Eugenius was obliged to take up his residence at Viterbo. After some fighting and many negotiations between the pope, assisted by the people of Tivoli, and the Romans, Eugenius repaired to France in 1147, and the following year held a council at Rheims. He afterwards returned to Italy, and with the assistance of Roger king of Sicily defeated the Romans, and entered the city, A.D. 1149. New disturbances however arose, which obliged him to take refuge in Campania, where he received of St. Bernard the book *De Consideratione*, the subject of which was advice on his pontifical station and its duties. After having resided some time at Segni he made peace with the Romans, and returned to Rome in 1152. He died the following year, and was succeeded by Anastasius IV. It was under his pontificate that Gratianus, a Benedictine monk at Bologna, compiled his code of canon law called 'Decretum Gratiani,' which greatly favoured the extension of the papal power. [CANON LAW.]

EUGENIUS IV., Gabriele Condulmero, a native of Venice, succeeded Martin V. in March, 1431. His was a most stormy pontificate. He drove away the powerful family of Colonna, including the nephews of the late pope, from Rome, charging them with having enriched themselves at the expense of the papal treasury. Two hundred of their adherents were put to death, and the palaces of the Colonna were plundered; but their party collected troops in the country and besieged Rome. Eugenius, through the assistance of Queen Joanna II. of Naples, defeated the Colonna, and obliged them to sue for peace and surrender several towns and castles they held in the Roman state. He afterwards made war against the various lords of Romagna, who were supported by the Visconti of Milan; and he appointed as his general the patriarch Vitelleschi, a militant prelate, who showed considerable abilities and little scrupulousness in that protracted warfare, by which the pope ultimately recovered a considerable portion of territory. But as Vitelleschi intended to keep Romagna for himself, the pope had him put to death. The famous condottiere Sforza figured in all these broils. But the greatest annoyance to Eugenius proceeded from the council of Basel, which had been convoked by his predecessor, and which protracted its sittings year after year, broaching doctrines very unfavourable to papal supremacy. After solemnly asserting the superiority of the council over the pope, it forbade the creation of new cardinals, all appeals from the council to the pope, suppressed the annates, or payments of one year's income upon benefices, which were a great source of revenue to the papal treasury, and made other important reforms. Eugenius, who had been obliged to escape from Rome in disguise on account of a popular revolt, and had taken up his residence at Bologna, A.D. 1437, now issued a bull dissolving the council, recalling his nuncio who presided at it, and convoking another council at Ferrara. Most of the fathers assembled at Basel refused to submit, and summoned the pope himself to appear before them, to answer the charges of simony, schism, and others; and after a time proceeded against him as contumacious, and deposed him. Eugenius meanwhile had opened in person his new council at Ferrara, in February, 1438, in which, after annulling all the obnoxious decrees of the council of Basel, he launched a bull of excommunication against the bishops who remained in that assembly, which he characterized as a 'satanic conclave, which was spreading the abomination of desolation into the bosom of the church.' The Catholic world was divided between the two councils; that of Basel proceeded to elect a new pope in the person of Amadeus VIII. of Savoy, who assumed the name of Felix V., and was solemnly crowned at Basel. The council of Ferrara in the meantime afforded a novel sight. The Emperor John Paleologus II. came with Joseph, patriarch of Constantinople, and more than twenty Greek bishops, attended by a numerous retinue, and took his seat in the assembly. The object was the reconciliation of the eastern and western churches, which Eugenius had greatly at heart, and to which Paleologus was also favourably inclined, as he wanted the assistance of the powers of western Europe against the Turks. The plague having broken out at Ferrara, the council was removed to Florence. After many theological disputations on the subject of the Holy Ghost, of the primacy of the pope, of purgatory, and other controverted points, the decree of reunion of the two churches was passed, and signed by both parties in July, 1439. The emperor and partiarch returned to Constantinople highly pleased with Eugenius; but the Greeks took offence at the terms of the union, the schism broke out afresh, and the separation of the two churches has continued ever since.

A grave charge against Eugenius is, that he encouraged the Hungarians and Poles to break the peace they had solemnly sworn with the Turks, under pretence that their oaths were not valid without the sanction of the pope; he even sent Cardinal Julian as his nuncio to attend the Christian army. The result was the battle of Varna, 1444, in which the Christians were completely defeated, and King Uladislaus of Poland and Cardinal Julian lost their lives.

Eugenius died at Rome A.D. 1447, after a reign of sixteen years, and in the sixty-fourth year of his age. He left the church in a state of schism between him and his competitor Felix, his own states a prey to war, and all Christendom alarmed at the progress of the Turkish arms. In his last days he is said to have expressed himself weary of agitation, and to have regretted the loss of his former monastic tranquillity before his exaltation. He recommended peace and conciliation to the cardinals assembled around him. He was succeeded by Nicholas V., in favour of whom Felix V. soon after abdicated. The pontificate of Eugenius forms a most stirring and interesting period in the history of Italy and of the church. L'Enfant and Æneas Silvius, afterwards pope, have written the history of the council of Basel. See also the general collections of the councils and Baluze's 'Miscellanios.'

EUKAIRITE, a seleniuret of silver and copper, discovered by Berzelius. It occurs in thin films of a shining lead colour; opaque; its texture is granular; it yields readily to the knife, and acquires a silvery lustre. It occurs in a copper mine in Sweden. Before the blow-pipe it exhales a

strong smell of selenium, and with charcoal fuses into a brittle metallic globule. It consists of—

Selenium	26
Silver	38·93
Copper	23·05
Earthy matter	8·90
Carbonic acid and loss	3·12
	100·

EU'LABES. (Zoology.) [ROLLERS.]

EULA'LIA (Zoology), a genus established by Savigny, and placed by Cuvier among his Dorsibranchiate Annelids. [DORSIBRANCHIATA.]

EULEN-SPIEGEL. [ENGLISH DRAMA, vol. ix., p. 423.]

EULER, LEONARD, a celebrated mathematician of the last century, was born on the 15th of April, 1707, at Basle, in Switzerland; his father, Paul Euler, was the Calvinistic pastor of the neighbouring village of Riechen. He was a man remarkable for unostentatious piety, and imbued with a considerable knowledge of mathematics, which he had acquired under the tuition of James Bernouilli.

After being instructed by his father in analytical science, young Euler was sent to the university of Basle, in which John Bernouilli was at that time professor, and by his rapid progress and decided mathematical genius he so far gained the esteem of his teacher and of the sons, Nicholas and Daniel Bernouilli, that his father was easily dissuaded from his original intention of forming his son into a divine, and wisely allowed him to pursue unshackled the high distinctions then conferred by a profound scientific reputation.

A prize having been proposed by the French Academy of Sciences on the management of vessels at sea, the ambition of Euler, then only nineteen years of age, induced him to attempt an essay, which was received with considerable applause, though the prize was conferred on Bouguer, an old and experienced professor of hydrography.

The Academy of Sciences at St. Petersburg was then rising to a distinguished rank amongst similar institutions in Europe under the fostering patronage of Catherine I., who had invited several philosophers to her capital, among whom were the Bernouillis above mentioned. On the retirement of Daniel Bernouilli, Euler was appointed professor of mathematics under Peter I. in 1733; soon after which he married a Swiss lady named Gsell, by whom he had a numerous family.

His works previous to the date at which we have arrived were, with few exceptions, confined to those mathematical questions arising from the progressive march of the Integral Calculus, which, at that time, caused much emulation in different countries. In general, Euler was far more in his element in the abstruser parts of pure mathematics than in the applied; in many of the latter he was frequently conducted to paradoxical results.

In the memoirs of the Petropolitan Academy, 1729 and 1732, are found several of his memoirs on trajectories, tautochronous curves, the shortest line along a surface between two given points, and on differential equations; besides which he had published at Basle a physical dissertation on sound.

Euler found it convenient at this time to apply himself intensely to study, not more from his natural ardour for the sciences and the incentive of an increasing reputation than from the desire to avoid the political intrigues which, under a suspicious and tyrannical minister, then agitated Russia.

During this interval he published an excellent treatise on mechanics (Petersburg, 1736, 2 vols., 4to.), a treatise on the theory of music, and one on arithmetic, together with numerous papers in the Petersburg Memoirs, chiefly on astronomical and purely mathematical subjects, among which are contained his views on the solution of Isoperimetrical Problems, which embodied the profoundest researches on a matter of great analytical difficulty previous to the discovery of the Calculus of Variations by Lagrange. Upon the fall of Biren he gladly accepted an invitation from the king of Prussia to visit Berlin. When he was introduced to the queen-dowager in 1741, she was so much struck with the paucity of his conversation that on requiring an explanation, he replied that he had just returned from a country where those who spoke were hanged.

The princess of Anhalt-Dessau, being desirous to profit by the presence of Euler in Berlin, requested to be favoured with instructions on the known facts in the physical sciences. To this wish he fully acceded on his return to Petersburg in 1766, by publishing his celebrated work, 'Letters to a German Princess' (3 vols., 8vo., 1768); in which he discusses with clearness the most important truths in mechanics, optics, sound, and physical astronomy, having published previous to this date several isolated treatises and some hundred memoirs touching on every known branch of theoretical and practical mathematics. During his residence in Prussia he was much employed by the enlightened monarch who then governed that kingdom in questions connected with the mint, with navigable canals, &c. In the midst of such varied employments he was not forgetful of the ties which bound him to his native home· having learned his father's death, he went in 1750 to Frankfort to receive his widowed mother, and brought her to Berlin, where she lived until 1761, enjoying with a mother's feeling the glorious distinction to which her son by his talents and indefatigable industry had arrived.

An incident which occurred in 1760 showed how highly Euler was in general esteemed. The Russians having entered Brandenburg, advanced to Charlottenburg, and plundered a farm which belonged to Euler. When General Tottleben was informed who the proprietor was, he ordered immediate reparation to be made to an amount far above the injury, and the Empress Elizabeth presented him with 4000 florins.

In consequence of his unceasing application to study, Euler had the misfortune to lose the sight of one eye in 1735, and in 1766 that of the other; he however continued his valuable researches, some of his family acting as amanuensis, and his powers of memory are said to have been wonderfully increased even in his old age. He accepted the invitation of the empress Catherine II. of Russia to return to Petersburg in 1766, where he would have fallen a victim to an accidental fire which destroyed his house and property in 1771, but for the courageous efforts of a fellow-countryman (M. Grimon), who bore the old man away in his arms. His manuscripts were saved by the exertions of Count Orloff.

On the 7th of September, 1783, after some calculations on the motions of balloons, then newly invented, Euler dined with Lexell, and conversed on the lately-discovered planet Herschel. While playing with his grand-child, who was taking tea, he expired suddenly and without pain.

Euler was twice married in the same family, and had many children and grand-children; his habit of life was strictly religious, the labours of each day being closed with a chapter from the Bible and family prayer. A catalogue of his published and unpublished writings is given at the end of the 2nd volume of his 'Institutiones Calculi Differentialis,' 1787; and to the first is prefixed an eloquent Eloge by Condorcet.

Every useful subject of mathematical research engaged at some time the attention of Euler; and for relaxation he amused himself with questions of pure curiosity, such as the knight's move in chess so as to cover all the squares. His various researches have gone far towards creating the geometry of situation, a subject still imperfectly known. The following is one of the questions which Euler has generalized:—'At Königburg, in Prussia, the river divides into two branches with an island in the middle, connected by seven bridges with the adjoining shores; it was proposed to determine how a man should travel so as to pass over each bridge once and once only.'

The memoirs of Euler are principally contained in the following works:—'Comment. Acad. Petrop.,' 1729-51; 'Novi Comment. Acad. Petrop.,' 1750-76; 'Nova Acta Acad. Petrop.,' 1777-81; 'Mem. de l'Acad. des Sciences,' 1765, 1778; 'Recueil de l'Acad.,' 1727, &c.; 'Miscell. Beroll.,' tom. vii.; 'Mem. de l'Acad. de Berlin,' 1745-67.

EU'LIMA, a genus of marine Testaceous Gastropods, established by M. Risso.

Generic Character.—*Shell* turreted, acuminated, polished, with many whorls; aperture ovate, acuminated posteriorly; external lip thickened, generally forming numerous obsolete varices. *Operculum* horny, thin, its nucleus anterior.

Mr. G. B. Sowerby, who gives this generic character, says (*Zool. Proc.* 1834) that this genus of marine shells appears to be most nearly related to *Pyramidella* and *Rissoa*. A species, he adds, which has been long known has had the appellation of *Turbo politus* among British Linnean writers; and a fossil species has been placed by Lamarck among the *Bulini*, under the specific name of *B. terebellatus*. Mr. Sowerby separates the genus into the two

divisions below stated, which are characterized by the two species above mentioned; one has a solid *columella*, and the other is deeply umbilicated. All the species, he observes, are remarkable for a brilliant polish externally, and the shells are frequently slightly and somewhat irregularly twisted, apparently in consequence of the very obsolete varices following each other in an irregular line, principally on one side, from the apex towards the aperture. He describes sixteen species, chiefly from Mr. Cuming's collection.

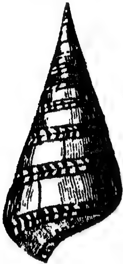
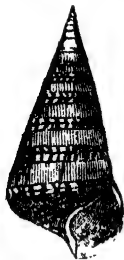
Geographical Distribution.—Wide; principally found, as yet, in warm seas (South and Central America, and Pacific Ocean, Australia) but there are several British species.

Habits.—The species found by Mr. Cuming were dredged or otherwise collected in sandy mud, coarse sand, and coral sand, on mother-of-pearl shells, or on the reefs; at depths (not including the reefs) ranging from six to thirteen fathoms.

a.

Perforated Eulimæ.

Example, *Eulima splendidula.* Shell acuminate-pyramidal, brownish, articulated with white and chestnut near the sutures; umbilicus large; aperture angulated anteriorly. Length 1·45, breadth 0·6 inches. Locality, Saint Elena, South America. Mr. Cuming dredged a single specimen in sandy mud at from six to eight fathoms depth.

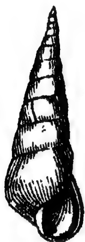



Eulima splendidula.

β.

Imperforate Eulimæ.

Example, *Eulima major.* Shell acuminate-pyramidal, opaque, milk-white; external lip subarcuated. Length 1·6 inches, breadth 0·4. Locality, the Island of Tahiti. The largest specimen was found in coral sand on the reefs.




Eulima major.

Fossil Eulimæ.

Mr. G. B. Sowerby says that the fossil species are found in the *calcaire grossier* near Paris.

EULI'MENE. [Branchiopoda, vol. v., p. 343.]

EULY'MENE. [Medusa.]

EUME'DONUS, a genus of brachyurous crustaceans, the first of the *Parthenopians* of M. Milne Edwards, and which, in his opinion, establish in some sort the passage between the *Stenorhynchi*, *Achæus*, on the one side, and *Eurynome*, *Lambrus*, and *Parthenope*, on the other. The form of the carapace is nearly pentagonal as in the latter, but it is, at the same time, thrown forwards, as it were, and scarcely overpasses the line of the feet of the hind pair of limbs, a disposition which recals the construction of the former. The *body* is depressed; the *rostrum*, which is very large and projecting, is only divided towards its extremity; the *eyes* are very short, and their peduncle entirely fills the orbits, which are circular; a character which again approximates these crustaceans to the *Stenorhynchi*: the internal *antennæ* are folded back very obliquely outwards, and the external antennæ are but little developed. The *epistome* is shorter than in the majority of the *Oxyrhynchi*. The *external jaw-feet* present nothing remarkable. In the male the *thoracic feet* of the first pair are large and much longer than the rest: all these are a little compressed, and their third joint is surmounted by a crest, which is not distinctly perceptible on the other joints; the feet of the second pair are rather shorter than those of the third and fifth pair, which are nearly as long as the fourth. The *abdomen* of the male is composed of seven articulations.

Example, *Eumedonus niger*. This small species, the only one known, is of a bronzed black colour, and inhabits the coasts of China. [Parthenope.]

EU'MENES, of Cardia, a town in the Thracian Chersonese, was an important actor in the troubled times which followed the death of Alexander the Great. [Alexander III.; Antipater; Arrhidæus; Perdiccas.] Being early taken into the service of Philip of Macedon, he served him for seven, and Alexander for thirteen years, in the confidential office of secretary. He also displayed great talent for military affairs through the Persian campaigns, and was one of Alexander's favourite and most esteemed officers. After Alexander's death, in the general division of his conquests, Cappadocia, Paphlagonia, and the coast of the Euxine as far east as Trapezus, fell to Eumenes' share. This was an expectancy rather than a provision, for the Macedonian army had passed south of these countries in the march to Persia, and as yet they were unsubdued. Perdiccas, however, took arms to establish Eumenes in his new government, and did so, at the expense of a single battle. To Perdiccas as regent, and after his death to the royal family of Macedon, Eumenes was a faithful ally through good and evil; indeed he is the only one of Alexander's officers in whose conduct any appearance of gratitude or disinterestedness can be traced. When war broke out between Ptolemy and Perdiccas, B.C. 321, he was appointed by the latter to the chief command in Asia Minor between Mount Taurus and the Hellespont (Cor. Nep., c. 3), to resist the expected invasion of Antipater and Craterus. The latter he defeated; but the death of Perdiccas in Egypt threw the balance of power into Antipater's hands, who made a new allotment of the provinces, in which Eumenes was omitted, and Cappadocia given to another. The task of reducing him was assigned to Antigonus, B.C. about 320. The rest of his life was spent in open hostility or doubtful alliance with Antigonus, by whom he was put to death, B.C. 315, as is related in that article, vol. ii., p. 101. Eumenes was an admirable partizan soldier, brave, full of resources, of unbroken spirits. Those parts of Diod. Sic., book xviii., which relate to him, and Plutarch's *Life*, will be read with pleasure by those who are fond of military adventure. Plutarch (*Life of Eumenes*, c. ii.) speaks of some of his letters. The reader may consult also Droysen, *Geschichte der Nachfolger Alexanders*, Hamburg, 1836.




Coin of Eumenes.

British Museum. Actual size. Silver. Weight, 263 grains.

EUME'NIDES (the kind goddesses), a name given to the Erinyes or Furies, a set of goddesses whose business it was to avenge murder upon earth. They were also called Semnæ, or 'venerable goddesses.' The name Erinys was derived from the old Arcadian word *erinuein* (ἐρινύειν), 'to be angry.' (Pausan. viii., 25, 6.) These goddesses appear in the play of Æschylus which bears their name, not only as the instruments of wrath and the pleaders for justice against the matricide Orestes, but also as the promisers of victory, prosperity, and all sorts of blessings to the Athenian people: this mixture of characters is to be explained by the fact that their worship was connected with that of a Demeter Erinys at Thelpusa, in Arcadia, and we have seen elsewhere how the goddess of the earth and its productions was also the goddess of the nether world. [Bacchus; Demeter.] The site of their temple at Athens, where their worship possessed a peculiar importance, was the north-east angle of the Areopagus, at its base. 'There is a wide long chasm there formed, by split rocks, through which we enter a gloomy recess. Here is a fountain of very dark water,'

(Wordsworth's *Athens* and *Attica*, p. 79.) The Athenians sacrificed to the Eumenides, among other victims, black sheep: no wine was mixed up with the libations offered to them, but only oil, honey, and water, in three separate libations, out of different vases. (Soph. *Œd. Col.*, 469, &c) Of the number of these goddesses we have contradictory accounts: in the play of Æschylus it is pretty certain that there were fifteen in the chorus. (Müller's *Eumenides*, § 10.) Every question connected with these divinities is accurately and satisfactorily discussed by Müller in the second essay at the end of his edition of the *Eumenides*, § 77—93.

EUMOLPUS, EUMOLPIDÆ. [ELEUSIS.]

EUMORPHUS, a genus of coleopterous insects belonging to the section *Trimeri* of Latreille, and being the typical genus of the family *Fungicolæ*. These insects are characterized by having the antennæ longer than the head and thorax, the body oval, and the thorax irregularly square; the maxillary palpi filiform, or slightly thickened at the end, but not terminated by a large process as in some genera: the last joint of the tarsus is always deeply divided into two lobes.

Latreille (*Règne Animal*) divides the genus Eumorphus into several sub-genera. Some of the species have the third joint of the antennæ much longer than any of the other joints: these form the genus Eumorphus (proper), in which the antennæ are club-shaped. All the species are natives of America or the East Indies. Ex.: Eumorphus immarginatus. (Latr. *Gener. Crust. et Insect.*, tab. xi., fig. 12.)

2nd Sub-genus, *Dapsus* (Ziég.). Some of the species have the antennæ club-shaped, as in Eumorphus proper, but straighter and more elongated, and with the joints bent laterally: among these, Eumorphus Kirbyanus (Latr.) is now placed. In other species of Dapsus the third joint of the antennæ is not longer than any of the others. Many of the species of Dapsus are indigenous in Europe, living in different fungi, whence the name of the family (Fungicolæ). Some of these insects are also found under the bark of the birch and other trees. 3rd Sub-genus, *Endomychus* (Fab.) has the three last joints of the antennæ bent laterally, larger than the others, and forming a triangular club-shaped mass. 4th Sub-genus, *Lycoperdina* (Latr.) has the maxillary palpi filiform, and the last joints of the labia are enlarged. [TRIMERI.]

EUNA'PIUS, one of those writers known by the name of Byzantine historians, was born at Sardes, in Lydia, A.D. 347. He began his studies under the care of Chrysanthius the Sophist, by whose advice he is said to have composed the lives of some philosophers and physicians. In his sixteenth year he left Asia for Athens to attend the lectures of Proæresius, by whom he appears to have been subsequently treated with the utmost kindness. On his voyage he was seized with fever of a very violent kind, which yielded only to treatment of a peculiar nature. After attending Proæresius for five years he meditated a journey to Egypt, in imitation, as Hadrian Junius says, of Plato and Eudoxus; this intention however he was prevented from fulfilling. He practised medicine with considerable repute, and distinguished himself by a vehement antipathy to Christianity, produced, as is probable, by its growing corruptions.

Besides his biographical works, he wrote a continuation of Dexippus' history, from the reign of Claudius Gothicus, where he quitted it, to the year 404 A.D. It is violently in favour of the old creed, and, in the opinion of Hadrian Junius, shared those peculiarities of style which distinguish the Sophists. All that remain of his historical works are contained in the recent edition of the Byzantine Historians. There is a complete edition of his works by Boissonade, in 2 vols. 8vo., Amsterdam, 1822, with Wyttenbach's notes, and a life by Hadrian Junius. (See Photius, codd. 77, 219; Suidas, under the word 'Κωνσταντῖνος;' and Eunapius in his life of *Proæresius*.)

EUNO'MIA. [MILLEPORIDÆ.]

EUNO'MIUS, one of the chiefs of the Arian sect during the greater part of the fourth century, was a native of the town of Dacora, in Cappadocia, and at first was a lawyer. It is said that he also followed for some time the military profession. He then became a disciple of Aetius, under whom he very successfully studied the doctrinal theory of Christianity as understood by the Anti-Trinitarians. At Antioch he was ordained a deacon, and about A.D. 360 he was elected bishop of Cyzicum. The divinity of Christ was at this period the all-absorbing subject of ecclesiastical controversy. The Trinitarians contended for the Athanasian or Homoousian doctrine (from ὁμοουσίος, of the same essence), against the Semi-Arians, who held the Homoiousian doctrine (from ὁμοιούσιος, of the like essence), and against the doctrine of the Anomoians (from ἀνομοῖος, of a different essence). In defence of the last theory, or that of unmodified Arianism, Eunomius exerted a high degree of natural abilities, asserting the impossibility of two principles in a simple substance, one of which is generated from the other, and exhibits the relation of a son to his father. The divine essence, he said, is necessarily characterized by oneness and indivisibility; the persons of the Godhead, like the divine attributes of wisdom, justice, mercy, &c., are merely the names of ideal distinctions of the one Supreme Essence, as considered in its different relations with exterior objects, and it is contradiction and manifest absurdity to suppose this simple essence to consist of a plurality of principles or parts. In reply to these psychological subtleties, the advocates of the Trinitarian doctrine alleged the total incomprehensibility of the nature of God. (St. Basil, *Epist.* 166, St. Chrysostom, *De Incomprehensibilitate Dei Naturæ*.) Eunomius still acknowledged a father, son, and holy spirit, but the father as supreme, eternal, and distinct; the son as generated from the father; and the holy spirit as generated from the son.

In the ceremony of baptism he dipped only the head and shoulders, regarding the lower parts of the body as disreputable, and unworthy of immersion in the holy water; and it is said he taught that those who faithfully adhered to his own theory of Christian doctrine might commit any degree of sin without incurring the danger of perdition; but this is probably a misrepresentation by his opponents, who also accuse him of being an Antinomian, that is, one of those who reject the Mosaic law. (Theodoret, *Hæret.*, l. 4, c. 3; St. Augustin, *de Hæres.*; Epiphanius, *Hæres.*, 76; Baronius, *ad an.* 356.) Eunomius experienced a great severity of persecution without swerving in any degree from the Arian tenets with which he commenced his career. He was thrice banished from his episcopal see; first, by Constantius to Phrygia; then by Valens to Mauritania; and lastly, by Theodosius to the Island of Naxos: however, he died in peace, at a very advanced age, in the year 394. Most of his works are lost, including a copious commentary on the Epistle to the Romans, in 7 volumes, and numerous letters. Two of his principal treatises are printed in the *Bibliotheca Græca* of Fabricius, in Greek and Latin (tom. 8, pp. 235—305): 'A Confession of Faith,' presented in 383 to the Emperor Theodosius; and an 'Apologetic Discourse' in 28 chapters. (Cave's *Prim. Christianity*, part 2, c. 11; Pluquet's *Dict. de Hérésies*; Broughton's *Historical Dict.*; Dr. A. Clarke's *Succession of Sac. Lit.*, vol. i., p. 318; Basnage, in *Canisius*, i. 172.)

EUNUCH (εὐνοῦχος, *eunúchus*, literally, 'one who has the care of a bed'). The Greek word may be considered as descriptive of the functions of those who were made eunuchs, it being usual among the Persians to entrust the care of their wives and daughters to such persons. It does not appear that eunuchs were made by the Greeks, except as we shall presently mention. This peculiar species of barbarity was a Persian practice (Herod. vi. 32). It appears however that the Greeks sometimes carried on the trade of making eunuchs, whom they sold at Ephesus and Sardes to the Persians for high prices; the Persians considering that eunuchs generally were more trustworthy than other men. (Herod. viii. 105.) Tavernier tells us that in the kingdom of Bootan twenty thousand eunuchs were annually made in his time, to sell to other nations; and the seraglios of the East are principally served and guarded by them to the present day.

The Christian emperors of Rome forbade the practice of making eunuchs, particularly Constantine; and Justinian imposed a law of retaliation upon such as exercised this inhumanity. In Italy however the process of castration is still practised upon children intended to supply the operas and theatres of Europe as singers. The Council of Nice condemned those who from excess of zeal made eunuchs of themselves. Persons so mutilated were not admitted into holy orders. The reader who would know more on this subject may consult the 'Traité des Eunuques,' 12mo., 1707, by M. d'Ancillon.

Certain heretics of the third century bore the name of Eunuchs who had the folly or madness, after the example

of Origen, not only to castrate those of their own persuasion, but all whom they could lay hands on. They were also called Valesians, from Valesius, an Arab, who was their chief. (See Epiphanius and Baronius' *Annals*, under the years 249 and 260.)

EUO'MPHALUS. [Trochidæ.]

EUPATO'RIA. [Crimea.]

EUPATORIA'CEÆ, one of the tribes of composite plants admitted by De Candolle, who defines it thus:—'Style of the hermaphrodite flowers cylindrical; the arms long, somewhat clavate, covered externally with downy papillæ at the upper end. The stigmatic series but little prominent, and usually disappearing before they reach the middle of the arms of the style.' Under this character are arranged 38 genera, the most extensive of which is the genus Eupatorium, including no fewer than 294 species.

EUPEN, a circle in the Prussian administrative circle of Aachen, or Aix-la-Chapelle, and in the western part of the province of the Lower Rhine, is, though wooded and mountainous, full of fine pastures. It contains about 76 square miles. It produces timber, grain, vegetables, flax, &c., and large quantities of cheese are made. There are considerable manufactures. Iron, calamine, and potters' clay, are among its mineral products. The population in 1816 was 17,419; in 1831, 19,058; and is now about 19,800.

EUPEN, the chief town (the Néau of the former department of the Ourthe), is situated in a fertile valley on the banks of the Weeze, in 50° 39′ N. lat. and 6° 1′ E. long. It is well built, and with its gardens and meadows covers a considerable surface. It has four churches and chapels, an orphan asylum, and a good school, and contains nearly 1200 houses. The number of inhabitants was 8805 in 1818; 10,534 in 1831; and is at present about 11,300. There are large manufactures of kerseymere and fine woollens. The other productions are woollen yarn, soap, chicory, powder, deals, blotting paper, &c. It is a place of extensive trade, and has several manufacturing villages in the neighbourhood.

EUPHEUS. [Isopoda.]

EUPHO'RBIA, a genus of exogenous plants, giving its name to an extensive and important natural order. It has very small monandrous naked male flowers, crowded round an equally naked female one, in the inside of an involucre looking like a calyx, and formerly mistaken for that organ. The species have either a common leafy appearance, with the involucres proceeding from among large foliaceous bracts, or they are nearly leafless, with their stem excessively succulent, so as to resemble Cacti. Those with the former character are natives of most parts of the world, and are the only kinds found in Europe; the succulent species chiefly appear in the hottest and driest countries. Barren uncultivated places in the plains of Hindostan and the arid regions of Asia and the north of Africa are their favourite stations; in the Canaries, on volcanic soil, E. Canariensis and laphylla form great bushes with arms like candelabras. From Cacti, which some of these plants much resemble, they are readily known by their spines, when they have any, not growing in clusters, and by their emitting, when punctured, an abundant discharge of milky juice. This, in a concrete state, forms what is called the gum-resin, or rather resin, called Euphorbium, an acrid, corrosive, most dangerous drug, principally furnished by E. officinarum, antiquorum, and E. Canariensis. The same properties exist in the herbaceous leafy species, diffused in some, concentrated in others.

E. Lathyris, a common weed in cottage-gardens, where it is called 'caper,' yields from its seeds an oil of the most violent purgative nature. If it were less dangerous it might be substituted for Tiglium oil. Fée states that with as much of this oil as could be sold for a franc ninety adults might be purged.

A few species, having the involucre of some showy colour, are cultivated as objects of ornament; otherwise they are looked upon as mere weeds.



Euphorbia officinarum.

EUPHORBIA'CEÆ, a natural order of exogenous plants, with unisexual flowers and tricoccous fruit. Their real affinity is a matter of great uncertainty. Jussieu placed them among his Diclinous Dicotyledons, and probably he was right in so doing; nevertheless there are many strong marks of resemblance between them and Malvaceous, Celastraceous, and even Elæagnaceous plants. The number of Euphorbiaceæ is unknown, but certainly very considerable. They vary from trees of the largest size to minute herbs, of only a few weeks' duration, and from having both calyx and corolla highly developed to the total absence of those organs. In fact they are constant in scarcely anything except the short character we at first assigned them, and in their sensible properties. Acridity, a virulent corrosive property, which sometimes is so concentrated as to render them most dangerous poisons, and sometimes so diffused as to be of little importance, with all imaginable intermediate qualities, exists throughout the order. Hence some are fatal, others drastic or purgative, and some simply laxative. They also occasionally secrete a farinaceous substance which, being separated from the poison, is valuable for the food of man, as in the Cassava.

Among the more dangerous species of this order are the Manchineel, whose very shade is asserted to be dangerous, the Excæcaria, which derives its ominous name from its juice producing blindness; and the Euphorbias, that yield Euphorbium, Castor oil, and oil of Tiglium, well known valuable purgative medicines. Among other products may be named Cascarilla, the bark of a Croton, Turnsole, afforded by a Crozophora, Caoutchouc, the produce of Siphonia elastica, Hura crepitans, and others, and a kind of bird-lime yielded by Sapium aucuparium.



Andrachne telephioides.

1, a male flower; 2, a female flower; 3, an ovary nearly ripe; 4, a section of a ripe fruit.

EUPHO'RBIUM, improperly called a gum, or gum-resin, since it is entirely destitute of any gum in its composition, is the concrete juice of several species of euphorbia, either exuding naturally or from incisions made in the bark. Much of the article found in British commerce is obtained from the Euphorbia Canariensis, while that which occurs on the continent is obtained from Euphorbia officinarum (Linn.) and E. antiquorum (Linn.), and other African species, particularly from an undescribed species, called by the Arabs *dergmuse*. The branches of this plant are used in tanning, and to it, according to Mr. Ja

Medical and Surgical Journal, vi. p. 457), the morocco-leather owes its peculiarities. By the most recent chemical analyses, euphorbium seems to consist of resin, wax, and saline matter (mostly malates). The resin is the active principle, and differs in some respects from most other resins.

Euphorbium is a powerful acrid substance, causing irritation and inflammation of the parts with which it comes in contact, and by sympathy affecting the nervous system. The dust received into the nostrils or eyes occasions violent sneezing and lachrymation, or even more serious affections of the eyes, so that it is necessary for those who grind this drug to protect the face by masks. Delirium and stupor approaching to apoplexy have followed the inhalation of the dust. When swallowed, it causes, in small doses, vomiting and purging; in larger doses it produces inflammation of the stomach, and sometimes proves fatal. It is now little used, even as an external application to produce vesication or ulceration, except by veterinary surgeons. It is sometimes used as an errhine, largely diluted with starch, and enters into the composition of some cephalic and eye-snuffs; but it is apt to be violent in its effects. In case of poisoning by it, demulcent or oily fluids should be given, and venesection employed if much inflammation ensue.

EUPHRA'TES. [TIGRIS.] As new information may be expected on the subject of the Euphrates, we have determined to treat of this double river system under the head of TIGRIS.

EU'PION, a liquid obtained by Reschenbach from animal tar, especially that of bones or horns. The process for procuring it is operose and complicated. Its properties are—that it is very limpid, colourless, inodorous, and tasteless; it boils at about 340° Fahr., and distils unchanged; it remains fluid at 4°. It is insoluble in water, but dissolves in alcohol, oil of almonds and of olives, oil of turpentine, naphtha, &c.; it dissolves chlorine and bromine, which are cooled when it is heated, and it also takes up camphor, stearin, and napthalin, at common temperatures, but when heated, in larger quantity; with iodine it forms a blue solution: it dissolves phosphorus, sulphur, and selenium, when heated, but the greater portion is deposited on cooling; caoutchouc swells in it, and when heated dissolves. It is not altered either by exposure to air, or by acids or alkalis. It has not been analyzed.

EU'POLIS, a writer of the old comedy, was born at Athens about the year 446 B.C. (Clinton's *Fasti Hellenici*, ii. p. 63), and was therefore a contemporary of Aristophanes, who was in all probability born a year or two after. The time and manner of his death are involved in great obscurity. It was generally said that he was thrown overboard by the orders of Alcibiades, when that general was on his way to Sicily in 415 B.C., because Eupolis had ridiculed him in one of his comedies; but this story, which is sufficiently improbable in itself, was refuted by Eratosthenes, who brought forward some comedies which he had written subsequently to that period (Cicero *ad Attic.* vi. 1); besides, his tomb was, according to Pausanias (ii. 7, 3), on the banks of the Asopus, in the territory of the Sicyonians. Another account states that he fell in a sea-fight in the Hellespont, and that he was buried in Ægina. We have the names of twenty-four of his plays, but no adequate specimens of them. To judge from the titles, the object of Eupolis must have been, in almost every case, mere personal satire. The *Maricas*, which appeared in 421 B.C., was an attack upon Hyperbolus, the demagogue; the *Autolycus* (420 B.C.) was intended to ridicule a handsome pancratiast of that name, who is the hero of Xenophon's *Symposium*; and the *Lacedæmonians* was directed against the political opinions of Cimon, who was too much attached to that people, and had even called his son Lacedæmonius (Thucyd. i. 45). From the concurrent testimony of Lucian (*Adv. Indoctum*, § 217), of Platonius, and of the scholiast on Juvenal (ii. 92), it appears that the object of Eupolis in writing the *Baptæ* was to ridicule Alcibiades for taking part in the obscene rites of Cotytto, and that it was for this attack that Eupolis was thrown into the sea. (See Buttmann's *Essay on the Cotyttia and the Baptæ*, *Mythologus* ii. p. 159, &c.) Aristophanes and Eupolis were not upon good terms. Aristophanes speaks very harshly of his brother poet in *The Clouds* (551, &c.), and charges him with having pillaged from *The Knights* the materials for his *Maricas*; and Eupolis in his turn made jokes on the baldness of the great comedian (Schol. on *The Clouds*, 532). Eupolis published his first play when he was only seventeen years old (Suidas).

EURE, a river in France, which rises in the marshes and pools which occupy the eastern extremity of the department of Orne, near the town of Longny. Seven or eight miles from its source it enters the department of Eure et Loir, through which it flows in a south-east direction for about 25 miles without receiving any considerable accession. It then turns northward, and flows in that direction for about 85 miles, through the departments of Eure et Loir and Eure, and past the towns of Chartres, Maintenon, Anet, Ivry, Pacy, and Louviers, into the Seine, which it joins just above Pont de l'Arche; receiving in succession the rivers Voise on the right bank; the Blaise, which waters Dreux, and the Arve or Aure from Nonancourt, on the left; the Vesgre, from Houdan, on the right; and the Iton, which passes Damville and Evreux, on the left. Its whole course is nearly 120 miles. It is navigable from Pacy, about 27 miles above its junction with the Seine, or, according to another authority, from St. George's at the junction of the Aure, about 20 miles higher up; but the navigation is liable to frequent obstructions. It is chiefly used for the conveyance of salt, and of wood for building and fuel for the supply of Rouen. The Eure never freezes in winter.

EURE, a department in the north of France, comprehending a portion of the antient Normandie. It is bounded on the north by the department of Seine Inférieure, from which it is partly separated by the Seine; on the east by the departments of Oise and Seine et Oise, from both of which it is in part separated by the river Epte, a feeder of the Seine; on the south by the department of Eure et Loir, from which it is partly separated by the rivers Eure and Arve, or Aure, the latter a feeder of the Eure; on the south-west by the department of Orne, and on the west by that of Calvados. The form of the department is very irregular; its greatest length is from north-east on the Epte, near Mainville, to south-west, near Monnay, on the road from Rouen to Alençon, 68 miles, and its greatest breadth at right angles to the length, from Fiquefleur, on the Seine, to St. George's, at the junction of the Arve with the Eure, 65 miles. The area of the department is 298 square leagues, or 2297 square miles, rather more than the joint area of the English counties of Cumberland and Westmoreland, and rather less than the average of the French departments. Its population in 1832 was 424,248, or nearly 185 to a square mile, being considerably greater than both the relative and absolute population of the average of the French departments; and very far exceeding that of the two English counties just mentioned. The department lies between 48° 39′ and 49° 29′ N. lat., and 0°.15′ and 1° 48′ E. long. The capital is Evreux, in 49° 1′ N. lat., and 1° 8′ E. long.

The department has, properly speaking, no mountains, though that name is given to the crags which rise at the mouth of the Seine, near Quillebœuf, and do not much exceed 300 feet in height. Mount Rôti is the highest hill in the department; its barren summit rises above the fertile plain round Pont Audemer. The rivers all belong to the basin of the Seine, except the Calone, which falls into the Touques at Pont L'Evêque, in the department of Calvados. The Seine crosses the eastern side of the department in a north-western direction past Vernon, Petit Andely, and Pont de l'Arche, and flows for a short distance along the boundary. In its sinuous course below Rouen it again touches the northern boundary of the department three times, separating it from that of Seine Inférieure: its course within the department is about 40 miles, and along the border 27 miles; for all which it is navigable. The Eure crosses the department in a northward direction; 10 miles of its course are upon and 36 miles within the border, for 25 of which, or according to some, for the whole of which it is navigable. [EURE river.] The Arve, or Aure, has nearly 30 miles of its short course within or upon the border of the department; it flows east by north and joins the Eure on the border of the department at St. George's; it passes Chênebrun, Verneuil, and Nonancourt. The Iton rises in the department of Orne, and crosses this department in a winding channel in a north-eastern direction; its length is 60 to 65 miles; nearly the whole of its course is in this department; it passes Bourth, Breteuil, Damville, and Evreux. The Rille rises in the department of Orne, and crosses that of Eure in a northward direction till it falls into the Seine between Quillebœuf and Honfleur. It passes the towns of L'Aigle, in the department of Orne; and of Rugles, Neuve-

Lire. Beaumont, Briône, Pont-Authou, Annebaut, and Pont-Audemer in that of Eure; it receives between Beaumont and Briône the Charentonne, which rises in the department of Orne, and flows north-north-east past Chabrières and Bernay; the Charentonne receives the Gruil. The length of the Rille is nearly 80 miles, that of the Charentonne about 35 miles, and that of the Gruil 16 to 18 miles. The Epte and the Andelle, both feeders of the Seine, rise in the department of Seine Inférieure, and water the eastern side of the department of Eure; they have a length of about 50 and 28 miles respectively. Part of the course of the Epte is on the border of the department; most of that of the Andelle is within it.

The Iton and the Rille are, in one part of their course, absorbed by the strata over which they flow: the Iton loses itself near Damville, and flows underground for two miles.

The department is almost entirely occupied by the chalk which encircles the Paris basin and the strata more immediately connected with it, and covered with a vegetable soil, for the most part clayey, and very thin on the crests of the hills. Along the bank of the Seine there are some tracts covered with barren sand, and other parts are covered with the debris of quartz and silex, quite incapable of cultivation. Below Quillebœuf, a marsh on the bank of the Seine, once covered by the tide, has been reclaimed and brought into cultivation.

The climate is in general mild, moist, and changeable, bearing a considerable resemblance to that of England. The west and north-west winds bring rain and fog; these winds, with the north and the south-west, are the most common. The country is better wooded than France generally is, though it does not admit of comparison in this respect with England. In descending towards Pacy on the Eure, on the road from Paris to Caen, the magnificence of the prospect is very striking. The valley of the Eure, broad and perfectly level, abounds with fine trees, which enclose the rich meadows. But though the country is rich and fertile, the habitations of the peasantry are very wretched, being clumsily built of wood and earth, like the habitations of five or six centuries ago in the rest of France, and covered with thatch. Bricks and tiles might be made in the department, and houses built less liable to destruction by fire.

The agriculture of the department is considered to be in advance of that of the greater part of France. The produce in grain is considerable; in wheat it is twice as great as the average produce of the departments; and in rye and mixed corn or maslin three times as great: a considerable quantity of potatoes is grown, a small quantity of oats, and very little barley or buckwheat. The quantity of woodland is nearly a sixth of the whole area of the department; the quantity of land occupied in vineyards is small, and the amount of wine made is trifling. The plum, the pear, and the apple, are the fruits most cultivated: the principal timber trees are the oak, the beech, the elm, the hornbeam, the aspin, the service tree, the chestnut, the birch, and, in the valleys, the alder, the ash, the poplar, and the maronnier, or large chestnut tree. In the arrondissemens of Bernay and Pont Audemer, fine flax is grown from seed imported from Riga and Holland; and in various places, leguminous plants, hemp, weld or dyers' weed (for dyeing yellow), and teazles are cultivated. The farming is not very neat; and the hedgerows and ditches are not well kept. Plantations might be increased on the higher grounds. There are many natural meadows and pasture lands, and the cultivation of the artificial grasses is on the increase: the quantity of cattle is not much more than half the average of France, but the number of horses is above half as much again as the average. Horses are much employed in the labours of the field: the fine Norman breed, which the long wars had nearly destroyed, has been renewed with great care. The number of sheep is rather above the average of France: the wool is ordinary; but the flesh of those fed near the sea is delicate and in good repute. The number of swine and the quantity of poultry are considerable. Small game is tolerably plentiful; but the larger sorts, the roebuck, the stag, and the wild boar, which were formerly abundant, have been almost entirely destroyed since the Revolution. The rivers abound with fish, especially tench; and great quantities of the salmon and the shad ascend them from the sea and are taken.

The mineral productions are iron, freestone, sandstone, millstones, lime and gypsum, potters' clay, brick earth, and fullers' earth. There are several cold mineral springs; those of Vieux Conches are in the highest repute.

The manufactures of the department are various and important: Dupin (*Forces Productives et Commerciales de la France*, Paris, 1827), states the number of establishments of various kinds at 1511, of workmen at 30,157, and the value of the articles produced at 26,772,297 francs, or above 1,100,000*l*. The workmen are thus classified by Malte Brun: in the woollen manufacture 8500; in the iron and copper works 8000; in the tape manufacture 6000; in the cotton manufacture 4500; in the leather manufacture 1000; in the manufacture of glass, paper, and hosiery 2000. The population is not however collected into large towns, there being no town with 10,000 inhabitants, and only five which have 5000; and taking the whole department, the rural population is to that of the towns as nearly 5 to 1. There are many iron-works, and at Romilly on the Andelle are some of the most extensive and important copper-works in France; nails and pins are made at Rugles on the Rille, cards for carding wool and cotton, and machinery at Louviers, and machinery in the arrondissement of Louviers. The manufacture of linens is widely extended; the linens of Bernay are much esteemed. The woollen cloths of Louviers are among the best in France: other cloths of inferior quality, druggets and flannels, are made in different places in the department. Leather of excellent quality is made at Pont Audemer, and there are tan-yards at Evreux and other places. Tapes are made at the town and in the arrondissement of Bernay, bed-ticks at Evreux, and printed calicos and other cotton goods in various places: cotton and woollen and linen yarn are also spun. To the above articles may be added hosiery (at Pont Audemer), thread (at Bernay), glass, paper, musical instruments, ivory and boxwood combs. Dyeing and bleaching have been carried to great perfection.

The exportations to foreign countries consist of woollen cloths of all kinds, bed-ticks, linens, cotton goods, leather, copper goods, and pins: similar articles, together with iron goods, wood for the shipwright and the builder, and for fuel, corn and cattle, are sent into other parts of France. The imports consist chiefly of the raw material for the various manufactures.

The navigation of the Seine enables the department to communicate readily with Rouen and Paris: a cut in one part shortens the navigation a little: the Eure is navigable for a considerable part, if not the whole of its course in this department: the Iton is used for floating during part of its course; but the Rille is no longer used for that purpose It is navigable however up to Pont Audemer. The length of the navigable rivers and canals is half as much again as in the average of France. The department is also better provided with roads than the greater part of France: the road from Paris to Caen and Cherbourg crosses it from east to west through Pacy and Evreux; that from Paris to Rouen by Pontoise (department of Oise) and Ecouis: and that from Paris to Rouen by Vernon, Gaillon, and Pont de l'Arche, along the valley of the Seine, cross it from south-east to north-west. Roads from Rouen to Honfleur (department of Calvados) by Pont Audemer; to Alençon (department of Orne) through Bourgtheroude, Brîone, Bernay, and Chambrois; and to Evreux through Pont de l'Arche and Louviers; and from Evreux by Vernon to Gisors, also cross it in different directions. The road from Paris to Dieppe just passes through Gisors in the eastern extremity of the department; and that from Paris to Alençon, Laval, Rennes, St. Brieuc, and Brest, crosses the department just within the southern boundary following the valley of the Aure or Arve through Nonancourt, Tillières and Verneuil. A road from Rouen to Beauvais just touches the north-east extremity of the department. The other roads are bye-roads.

The department is divided into five arrondissemens: that of Les Andelys, in the east and north-east; that of Pont Audemer, in the north-west; that of Bernay, in the south-west; that of Evreux, in the south; and that of Louviers, central. The population is thus distributed among them: —Les Andelys, 64,337; Pont Audemer, 89,744; Bernay, 82,828; Evreux, 118,397; and Louviers 68,942. The number of cantons or districts under the jurisdiction of a justice of the peace is 36; that of the communes 844.

The principal towns are Evreux, the capital, on the Iton, population 7988 for the town, 9963 for the whole commune; Louviers, on the Eure, population 8627 for the town, 9885 for the whole commune; Pont Audemer, on the Rille, population 5305; Bernay, on the Charentonne, population

4480 for the town, 6605 for the whole commune; and Les Andelys, on the Seine, population 3432 for the town, 5168 for the whole commune. [ANDELYS, LES; BERNAY; EVREUX; LOUVIERS.] The population is from the returns of January 1, 1832.

In the arrondissement of Les Andelys there are Gisors, Etrépagny, Ecouis, Maineville, Lions-la-Foret, Charleval, and Ecose.

Gisors is on the Epte, which divides it into two parts, and on the road from Paris to Dieppe, 39 miles from Paris. The castle was built about A.D. 1100. In the wars of the English in France under Henry V., Gisors was taken by them; but it was afterwards delivered up to the French by the treachery of the governor. In the war of the 'League of the Public Good' against Louis XI. this town was taken by the revolted lords. There are considerable remains of the castle at the extremity of the town towards Rouen, on the river Epte. From its position and general outline, it much resembles the remains of Launceston Castle in Cornwall. The inclosure of the castle is now used as a market-hall; the fosse is planted with trees, and forms a promenade. Some portions of the antient town-wall yet remain. The church of Gisors is a large well-proportioned cross church, adorned with much elaborate sculpture; but its architecture is for the most part a jumble of Gothic and Roman. (Dawson Turner's *Tour in Normandy*.) It has some fine painted glass windows. The town itself is poor, but its situation is delightful, and the walks very pleasant. The population in 1832 was 3248 for the town, or 3533 for the whole commune. The inhabitants are engaged in bleaching calicoes and other fabrics, and manufacture cotton-yarn, printed calicoes, blonde and other lace, leather, glass and beer; they trade in corn and calves for the supply of Paris. There are a high school, a school of mutual instruction, a school for outline-drawing, and an hospital. Near Gisors is the antient castle of Vaux, now in ruins.

Etrépagny, otherwise Estrépagny or Trépagny, a small town a short distance west by north of Gisors, has a substantially-built church. Its population, as given in Dulaure's 'Histoire des Environs de Paris' (Paris, 1828), our latest authority, was 1250. The inhabitants manufacture lace, cotton-yarn, and knit goods, and trade in grain, pulse, cattle, and hemp. There are two fairs in the year.

Ecouis is on one of the roads from Paris to Rouen. It has a market-place covered in with wood, a château of modern construction, and an antient parish church, formerly collegiate. The last mentioned is a substantial but rather plain building in the form of a Greek cross; it contains the statues of several saints and the tomb of Jean de Marigny, archbishop of Rouen. The inhabitants are given by Dulaure at 634: they manufacture lace. There are two fairs in the year.

Maineville is near, but not on the Epte, a few miles north of Gisors.

Lions-la-Foret is on the little river Lieur, which flows into the Andelle. It was inhabited in the Roman times, as appears from some antient tombs, columns, painted walls, medals, and other antiquities discovered here at the beginning of the last century. There was in the middle ages a castle at Lions, where Henry I. of England died A.D. 1135. The population of the commune is given by Dulaure at 1900. The inhabitants manufacture printed calicoes and leather, and trade in corn.

Charleval is a small town at the junction of the Lieur with the Andelle. It takes its present name from a residence built here by Charles IX., of which there are some remains. Calicoes are printed and paper made. The neighbourhood is fertile.

Ecose or Ecos, a very small place, is near the Epte, and between Gisors and Vernon.

Pont St. Pierre, a village on the Andelle, has fulling-mills, a cloth factory, and a cotton-mill, in which above 300 workmen are employed; and at Romilly, just across the river, is an extensive foundry, employing above 300 workmen. Copper, brass, and zinc in sheets, and brass wire for pins are produced. At these works zinc is used instead of lapis calaminaris in the manufacture of brass. The coal is brought from Anzin and St. Etienne, in France [ANZIN; ETIENNE, ST.], and from Belgium.

In the arrondissement of Pont Audemer are Pont Audemer, Beuzeville, Conteville, Cormeilles, Lieurey, St. George du Vièvre, Pont Authou, Annebaut or Appeville, Bourgthéroude, Bourgachard, Routot, Bourneville, and Quillebœuf.

Pont Audemer is on the left bank of the Rille, and on the road from Rouen to Honfleur, 29 miles from Rouen. In the Norman period it was a military station, and was the first scene of conflict between Henry I. of England and his rebellious Norman barons: the victory was gained by the king, to whom the fortress immediately surrendered. In the fourteenth century it was defended successfully by its lord, the count of Evreux, against the generals of the king of France: this was the first siege in which cannon were employed in that kingdom. It was afterwards taken by Duguesclin, its castle razed, and the walls and towers of the town destroyed. It is a small neat place, at the foot of an eminence, with handsome streets and good brick houses. It is defended by walls and a ditch, which may be filled with water at will by means of sluices. It has four gates, and several places or squares. There are several churches, but some of them are now desecrated and converted to other uses. The population in 1832 was 5305: the inhabitants manufacture cotton yarn, printed calicoes, muslins, bed-ticks, tapes, hosiery, and especially leather. The leather is thought to be the best in France. There are an agricultural society and a theatre. The river is navigable up to this town: several of the arms into which its channel is divided have mills on their banks.

Beuzeville has a population of above 2000: the inhabitants are engaged in tanning leather and sawing marble they have some linseed-oil mills.

Conteville is near the mouth of the Rille. The 'Dictionnaire Universel de la France,' our latest authority (Paris, 1804), gives its population at 900.

Cormeilles is on the road between Pont Audemer and Lisieux. It had formerly a Benedictine abbey, founded by William Fitzosborne, a relation of William the Conqueror. The church and other monastic buildings, which had gone much to decay, were repaired in the early part of the last century. The population, according to the 'Dictionnaire Universel de la France,' was 1210. There are an oil-mill, a paper-mill, and tan-yards; linen and calico are manufactured, and some trade carried on in corn.

Lieurey and St. George du Vièvre (population 900), where linen and paper are made, are between the Calone and the Rille.

Pont Authou (population 628), where woollen yarn is spun and cloth made, and cattle sold, and Annebaut (population 1150), where are the ruins of an antient castle, are on the Rille. The population of these places is given from Dulaure: it is not the last return.

Bourgthéroude, near the boundary of the department, not far from Elbœuf, derives its name (in Latin *Burgus Thuroldi*) from Thurold, one of the preceptors, and afterwards grand constable, of William the Conqueror. Its church was formerly collegiate. The inhabitants are given by Dulaure at 738.

Bourgachard is not far from Bourgthéroude. There was an abbey at Bourgachard, but it is now levelled with the ground; there is an hospital or almshouse. The population is given by Dulaure at 1114. The market is considerable.

Routot (population 1100, Dulaure), which trades in cattle and wool, and Bourneville (population 781, Dulaure), are on a bye-road from Bourgachard to Quillebœuf, which is on the left bank of the Seine, on a point formed by a bend of the river. Its port is much frequented by the boats which navigate the Seine, and those vessels which are too large to ascend the river as far as Rouen discharge their cargoes here. It was formerly a place of considerable strength. The inhabitants (1500, Dulaure) carry on a considerable fishery, or pilot vessels up the Seine; the women manufacture lace.

Montfort, on the Rille, between Pont Authou and Annebaut, is given as a village in some of our authorities, as a town in others. It has the ruins of an antient castle, besieged for thirty days in A.D. 1122 by Henry I. of England, and gives title to an English peer. The inhabitants (520, Dulaure) manufacture leather, paper, and woollen cloth, and trade in cattle and linen.

In the arrondissement of Bernay are Le Bec, Briône or Brionne, Beaumont le Roger, La Barre, Beaumenil, Chambrois, Thiberville, and Harcourt.

Le Bec, sometimes distinguished as Le Bec Hellouin, is near the bank of the Rille. Here, before the Revolution, was a Benedictine abbey of the congregation of St. Maur, one of

the wealthiest in Normandie, founded by Hellouin, a noble of the country, about A.D. 1034. The abbot's patronage was very extensive. Soon after its foundation this abbey became the seat of a famous school, founded here by Lanfranc, one of the monks of the convent, afterwards archbishop of Canterbury. Anselm, Theobald, and Hubert, also inmates of this abbey, were subsequently raised to the same archiepiscopal see, and Roger, the seventh abbot, had the offer of that dignity, but refused it. The sees of Rochester, Beauvais, and Evreux, were filled by monks from this abbey, which furnished abbots to the convents of Chester, Ely, and St. Edmund's Bury. The Empress Maud, daughter of Henry I. of England, is said to have been buried here. The abbey was fortified when Henry V. invaded France, and stood a siege of a month before it was surrendered to the English. The greater part of the conventual buildings still exist. The tower, 150 feet high, a few ruined arches, and one of the side chapels, are the only parts of the church which remain. A part of the grounds are appropriated to a stud for keeping up the breed of Norman horses. The town of Le Bec is unimportant: its population is about 700.

Brionne was, under the dukes of Normandie, a place of some importance; it had three churches, an abbey, and a lazar house, beside an antient castle, of which some slight remains exist, and it was the capital of an earldom, created in favour of a son or brother of one of the dukes of Normandie. The town is pleasantly and advantageously situated on the banks of the Rille. It has only one church now. The inhabitants may be estimated at about 2000. A mill for spinning cotton yarn employs 120 hands, and a cloth factory 500 · rape and linseed oils are expressed.

Beaumont le Roger, on the Rille, had also a strong castle and a Benedictine priory. The inhabitants are given in the *Dictionnaire Universel de la France* at 1325: a cloth factory employs 400 hands, a glass-house 100; bottles, chiefly intended for Bretagne, are blown in great quantity at the latter establishment.

La Barre and Beaumenil are between the Rille and the Charentonne: their population was, according to the *Dictionnaire Universel*, 948 and 484 respectively.

Chambrois is on the Charentonne, above Bernay; and Thiberville, near the source of the Calone; the inhabitants of the latter (population 1200 according to the *Dictionnaire Universel*) are occupied in weaving tape. This branch of industry employs at the neighbouring village of Drucourt and the surrounding communes, 4600 workmen.

Harcourt, not far from Brionne, gives title to an English nobleman: there are some remains of an antient castle, built by Robert de Harcourt, one of the companions of William the Conqueror in his invasion of England: the *Dictionnaire Universel* gives the population at 1297.

In the arrondissement of Evreux are Neuvelire, Rugles, Conches, Damville, Breteuil, Bourth, Chênebrun, Verneuil, Tillières, Nonancourt, Ivry, Pacy, St. André, Villiers-en-Desœuvre, and Vernon.

Neuvelire (otherwise Neuvelyre) and Rugles are on the Rille; the latter is higher up the stream. Neuvelire has 600 inhabitants, who trade in corn and cattle; at Viellelyre, near it, there are iron works. Rugles is of more importance; it is the centre of a pin manufacture which employs 2500 workmen, and of a nail manufacture which employs 3600 more. Zinc and copper are rolled out into sheets: the manufacture of iron cables, once carried on in this town, has been transferred to Nevers, in the centre of France.

Conches (pop. in 1826 1725) is on the river Conches, a small stream which joins the Iton between Damville and Evreux. Nails, agricultural implements, and other iron goods, are manufactured here: there are tan-yards, paper, oil and tan mills, and trade is carried on in iron, earthenware, hay, and cattle. The iron work of the bridges des Arts and d'Austerlitz at Paris were cast here.

Damville, Breteuil, and Bourth, are all on the Iton. Their population is given by Dulaure at 762, 2000, and 1670, respectively: there are iron works at all of them. Pins are made at Bourth; and at Breteuil, cannon of every calibre, projectiles of all kinds, screw taps, cauldrons, iron pots and other iron wares, tiles, and bricks. There are at Breteuil mineral waters and the remains of a castle, built by William the Conqueror.

Chênebrun, or Chennebrun, is on the Aure: it is very small; its population is about 360.

Verneuil is on the Aure: it is well laid out with broad straight streets, but wretched and ill-built houses of earth and wood, with a few only of brick: it had in 1832 a population of 3722 for the town, or 4178 for the whole commune. The manufactures of this town and its vicinity consist of leather for bookbinders (but this branch of industry has much declined) and of cotton hose, but this is also languishing. There is a Gothic church in the town, the steeple of which is said to have been built by the English, and an old tower, the remains of a castle which formerly defended the town. This tower is popularly but erroneously ascribed to the Romans. The site of the ramparts has been laid out in promenades. The English obtained a victory over the French at Verneuil in the reign of Henry VI., A.D. 1424. There is a small library.

Tillières and Nonancourt are also on the Aure: they have a population (according to Dulaure) of 950 and 1359 respectively. At Tillières pins and nails are made; and at Nonancourt woolcombers' cards, machinery, woollen and cotton yarn, woollen cloth, calicoes, hosiery, linen, and paper; trade is also carried on in corn and cattle.

Ivry, on the Eure, at the junction of the Vesgre, is celebrated for the battle fought in the adjacent plain, in which Henri IV. routed the army of the League under the duke of Mayenne, A.D. 1590. A pyramid, overthrown at the Revolution, but restored by Napoleon, commemorates the battle. It is a town of 800 inhabitants (Dulaure), who manufacture musical wind instruments, ivory and boxwood combs, cotton yarn, and leather, and carry on trade in corn, cattle, and horses.

Pacy is on the Eure, at the point where, according to some of our authorities, the navigation begins, in a fertile valley. It was antiently a place of some importance, and was defended by a castle and strong ramparts. Before the Revolution it had three churches (one parish church and two others) and a Benedictine abbey. The inhabitants, 1364 in number (Dulaure), trade in cattle and horses (for which they have a large fair), corn, woollen and linen cloth, and iron.

St. André, between the Eure and Iton, had a population of 977 (Dulaure): some trade in cattle is carried on.

Villiers en Desœuvre, a short distance from the bank of the Eure, had a population of no more than 450 (Dulaure); it has some trade in cattle and horses.

Vernon is on the left bank of the Seine, and on the road from Paris to Rouen. Here was in antient times a castle, which William the Conqueror bestowed on his relation, Guy, son of the count of Bourgogne, and which was strengthened by Henry I., the Conqueror's son. The town is situated in a singularly beautiful valley, and is connected by a bridge of twenty-two arches with the suburb of Vernonnet, on the other bank of the Seine. Of the antient defences of the town there remains only a tower, in which the archives of the place are preserved. The church, part of which exhibits some very early Norman architecture, was formerly collegiate; it contained before the Revolution several monuments. The population in 1832 was 2703 for the town, or 4888 for the commune, including the suburb, Vernonnet. Cotton velvet, plain and printed calicoes, leather, and cotton yarn, are manufactured: there is an establishment for making the equipage of the artillery, and another for sawing stone; also lime, gypsum, and tile kilns: trade is carried on in corn, flour, wine, wool, feathers, and cattle.

The arrondissement of Louviers contains Pont de l'Arche, Gaillon, and Neufbourg.

Pont de l'Arche is on the left bank of the Seine, just below the junction of the Eure, and at the point where the tide ceases to be perceptible. It owes its origin to Charles le Chauve, who erected here a palace, in which he convened councils, held assemblies of his nobles, and drew up edicts; and built a fine bridge, defended at one extremity by a citadel, from which the name of the place (in Latin Pons Arcis) is derived, and which was demolished about the beginning of the Revolution. Pont de l'Arche was burned by the English under Edward III. The walls of the town yet remain flanked by circular towers. The bridge is the lowest stone bridge down the Seine, and the only one of any kind between Vernon and Rouen: it is a picturesque object, with mills in some part of its length, and a lock under one of the arches to facilitate the navigation of the river and render it secure. On the bank of the river near the town are the remains of a Cistertian abbey, founded, A.D. 1190, by Richard Cœur de Lion, in pursuance, it is said, of a vow which he had made when nearly lost in the rapid current of the Seine. The church of Pont

de l'Arche, though much dilapidated, is a fine building in the decorated style of Gothic architecture: it has some rich carving, and handsome painted windows. The population is given by Dulaure at 1480: the inhabitants manufacture woollen cloth, and trade in cattle, horses, and fruit-trees.

Gaillon is near the left bank of the Seine, between Pont de l'Arche and Vernon. This town was bestowed by St. Louis on the archbishop of Rouen, whose successors had a palace here up to the period of the Revolution, and enjoyed the sole right of trying civil and criminal causes. This palace, destroyed in the wars of the English, A.D. 1423, was rebuilt a century afterwards by the archbishop, George d'Amboise, and embellished by his successors: after being nearly destroyed during the Revolution it has been repaired and fitted up as a prison, and contains now 1200 to 1400 prisoners who are employed in making carpets and cotton goods, and plaiting straw. There was a Carthusian convent here before the Revolution, founded by one of the archbishops of Rouen. A fountain in the town has the property of incrusting with its deposits any object thrown into it. Gaillon is a poor place; its population is given by Dulaure at 1030. The inhabitants carry on trade in cattle and woven goods. Near Gaillon are vineyards, the most northern in Normandie: the grape grown is the small black cluster; the wine produced is of very inferior quality.

Neufbourg or Neubourg, between Louviers and Beaumont le Roger, has the remains of an antient castle where the eldest son of Henry II. of England espoused Marguerite daughter of Louis VII. (*Le Jeune*) of France. The inhabitants, whom Dulaure gives at 1675, manufacture linens and calicoes, dimities, fustian, &c., and carry on trade in corn, wood, cattle, and iron goods.

The department constitutes the diocese of Evreux, the bishop of which is a suffragan of the archbishop of Rouen: it is in the jurisdiction of the Cour Royale of Rouen, and in the circuit of the 'Academie,' or council of education of that city. It is in the 14th military division, of which Rouen is the head-quarters. It sends seven members to the Chamber of Deputies. Education is more attended to than in the average of the French departments: it furnishes one male scholar for every twenty-four inhabitants. This department consists of parts of the former districts of Le Vexin Normand, Le Roumois, La Campagne, Ouche, Lieuvin, all in Haute or Upper Normandie.

EURE ET LOIR, a department in France, occupying a portion of the country between the Seine and the Loire. It is bounded on the north by the department of Eure, on the east by that of Seine et Oise, on the south-east by that of Loiret: on the south by that of Loir et Cher; on the south-west, for a short distance, by that of Sarthe; and on the west by that of Orne. Its only natural boundary is on the north, where it is separated from the department of Eure by the rivers Arve (or Aure) and Eure, and for a very little way on the north-east. Its greatest length is from north by east, near Villiers in Descœuvre (department of Eure) to south by west near Cloyes on the Loir, 68 miles, and its greatest breadth, at right angles to the length, is from near Nogent le Rotrou to the neighbourhood of Thoury, 55 miles. It is between 47° 57′ and 48° 56′ N. lat., and between 0° 45′ and 1° 59′ E. long. The area of the department is 304 square geographical leagues (French measure) of 25 to a degree, equal to 2325 English square miles, which is not much below the average area of the French departments, and a very little more than that of the two English counties, Kent and Surrey, taken together. The population in 1832 was 278,820, or 120 to a square mile, about three-fourths of the average population, absolute and relative, of the French departments, and not so much as three-tenths of that of the two English counties. Chartres is the capital.

There are no very lofty hills in the department, but the general level of the country is high; the western part is varied with hills and valleys, the hills being a prolongation of those which overspread Bretagne and Upper Normandie, and which enter this department from the north-west; in the south-eastern side of the department these hills expand into an elevated plain, or table-land, level and without water, though just between two of the largest rivers of France, the Loire and the Seine. This table-land extends on the south-west into the adjacent department of Loiret. The hills divide the department into the basins of the two rivers from which it takes its name; that of the Eure occupying the northern part, and that of the Loir the southern.

The Eure enters the department not far from its source, and flows through it, or along the border, about 70 miles, first in a south-eastern direction past Belhomert, Pontgouin, and Courville, and then in a northward direction past Chartres, Maintenon, and Nogent le Roi. [EURE River.] Its chief tributaries are the Voise (17 miles long), which rises near Auneau and flows into it from the south-east on its right bank below Maintenon, passing the towns of Guédelongroy and Gallardon; the Blaise (about 26 miles long), which rises near Senonches and flows into it from the south-west near Dreux, passing Maillebois and Dreux, and flowing in a channel continually dividing and re-uniting; the Aure, which has been noticed elsewhere [EURE Department]; and the Vesgre (22 miles long), which rises in the adjoining department of Seine and Oise, between Montfort L'Amaury and Rambouillet, and flows in a north-west direction through this department into the Eure at Ivry. The Mauvette, or Meuvette (14 miles long), rises near La Ferté Vidame and flows north-east past Brezolles into the Aure at Nonancourt; and the Oplon, which is a feeder of the Vesgre, and belongs to the department of Seine and Oise, flows for a very short distance along the eastern boundary of the department.

The Loir rises on the south-west slope of the hills which divide the two basins, a short distance south of Courville, and flows 10 miles south, past Illaire, or Illiers, just below which it receives the Thironne, and afterwards the Fouchard; it then flows south-east, and then south (12 miles) past Bonneval, near which it receives the Ozanne; all these join it on the right, or west bank. It then turns to the south-west, and flows 20 miles before it quits the department, receiving by the way the Connie, on the left bank, and the Yere on the right. The whole course of the Loir is about 160 or 170 miles, for nearly 30 of which (viz., from Château du Loir) it is navigable; it falls into the Sarthe just before the junction of that river with the Mayenne: the whole belongs to the system of the Loire (La Loire, feminine), from which the Loir (Le Loir, masculine) is to be carefully distinguished, both as to itself and its orthography.

The Thironne (12 miles long), the Fouchard (15 miles long), and the Ozanne (25 miles long), all rise a short distance east or south-east of Nogent le Rotrou, and all flow east by south into the Loir. The Connie, or Conie (above 20 miles long), rises in the adjoining department of Loiret, near Patay, and flows west-north-west into the Loir, receiving the Connie Palue (12 miles long), which has all its course in the department, on its right bank. The Yere rises in the south-west corner of the department, and flows east-south-east 22 miles into the Loir.

The Hume, a feeder of the Sarthe, just passes Nogent le Rotrou on the western side of the department; and the Braye, which separates the departments of Sarthe and Loir at Cher, and joins the Loir much lower down, has its rise just within this department.

The canal from Pont-gouin to the aqueduct of Maintenon connects the upper part of the Eure at Pont-gouin with the lower part of the same river at Maintenon. The canal is about 27 miles long. The aqueduct was originally designed to convey the waters of the Eure to Versailles, but the design was given up; and the aqueduct, a vast pile, is fast going to decay.

The étang, or pool, of Bois Ballu is supplied with water chiefly from a deep pit, from which, at certain periods, fishes of considerable size are ejected, which disappear a few days after.

The greater portion of this department is occupied by the chalk which encircles the Paris basin, or the strata most immediately connected with it: on the south-east a considerable tract is occupied by the various formations which overlie the chalk. The soil and produce are thus somewhat vaguely described in the *Dictionnaire Géographique Universelle*, Paris, 1827:—'The lands in this department are clayey, mixed with a small quantity of sand; there are also some calcareous soils mingled with clay and sand; others are clayey mingled with large flints (fragmens grossiers de silex); others consist of a deep arid sand. The slopes of the south-west have little vegetable soil; they sometimes are composed of marl and flint (de marne et de silex), sometimes of a reddish sand and flint. The marl, which is found almost every where, is used for the improvement of the land. In the arrondissement of Nogent le Rotrou (the

western side of the department) there are many tracts of waste land scarcely capable of producing anything; the ashes of the heath and furze are used for manure. Two-thirds of the department consist of the former territory of Beauce, or Beausse [BEAUSSE], which is a great agricultural district: corn, especially wheat, which yields a great proportion of flour, constitutes its principal riches of this part of the department; the harvests are very abundant, and their produce is chiefly destined for the supply of Paris. In the rest of the department rye, barley, and oats are produced; pulse (légumes) is grown every where; the turnips of Saussaie, the melons of Nogent le Roi, and the onions of Chaudons are in high repute; few potatoes are grown; but in some parts rape, flax, hemp, dyers' weed (reseda luteola), and teazles are raised for the use of the manufacturers; hops grow spontaneously; the vine is cultivated in many places; the wine is of middling quality, and liable to turn sour in hot weather. There are few fruit-trees in the former district of Beauce, but many in the arrondissement of Nogent le Rotrou, especially apple-trees, which furnish cider for home consumption.'

According to M. Dupin (*Forces Productives, &c. de la France*) the value of land and the aggregate rental of the department are above the average of France; the quantity of wheat grown is to the average produce of the other departments as more than five to two; that of oats nearly as four to two; and that of potatoes, contrary to what is stated in the above extract, is more than eight to two. 'The forests (we quote again from the *Dictionnaire Géographique Universelle*) occupy an extent of 45,000 hectares (above 111,000 acres), and consist, in a great measure, of oaks and birches: all the woodland is on the western side of the department, except some round Dreux, in the northern part. The pasture and meadow-land is not in proportion to the quantity of arable, but it is of good quality. A considerable number of horned cattle of a small race are reared; but not a sufficient number of horses for the wants of the agricultural districts: those which are bred in the arrondissement of Nogent le Rotrou are in request for the light cavalry. There are many sheep, some of which yield a fine wool; pigs, fowls (which are sent in great quantity to Paris), and bees. Game is abundant; the rabbits are in repute, as well as the red partridges, plovers, lapwings, and especially a species of the plover called guignard, from which the Chartres pies derive their reputation; pigeons are again increasing. The rivers abound with fish; the golden carp of the Loir, the crayfish of its affluent, the Connie, the trout of the Blaise, the Eure, and the Huine, are accounted excellent.' The number of horses, however insufficient, is given by M. Dupin at 35,967, nearly 8000 above the average of the departments: the number of horned cattle is given by him at 56,464, more than 23,000 below the average: the quantity of wool grown is to the average produce of the departments in the proportion nearly of five to two; and this is more available for exportation, as the woollen manufacture of the department is not great. The department is essentially agricultural; corn is sent not only to Paris, but into the neighbouring departments. There are about 600 flour-mills; a great number of them are on the Eure, the Blaise, the Loire, and other streams. The cottages of the peasantry are, in some parts at least, of a most miserable character; they call to mind the tents of the antient Carnutes who occupied the country.

The only metal dug is some iron: but the mines supply only a part of the ore for the different iron-works, and are becoming exhausted: good freestone is quarried, and sandstone for pavement; there is much marl; peat for fuel is obtained in several places, also potters' clay, and clay for the finer kinds of earthenware produced in the manufactory at Sèvres.

The manufactures are of small importance; they are chiefly in the arrondissement of Dreux, and in that of Chartres. The manufacture of linen is generally diffused, but it is only in one place that it is carried on on a considerable scale; some cotton yarn is spun and some cotton goods are woven; woollen cloths, serges, and other light woollen stuffs, blankets, flannel, knit and woven hosiery, foot carpets, and common hats are made; there are a considerable number of tan-yards; a small quantity of earthenware is made, and a little beet-root sugar.

The department is very ill provided with the means of water carriage; a small part of the course of the Eure, along the boundary of the department, is, according to some of our authorities, navigable. With roads it is better provided. The great road from Paris through Tours to the south-west of France crosses the department, passing through Epernon, Maintenon, Chartres, Bonneval, Châteaudun, and Cloyes; the great western road from Paris to Rennes and Brest just crosses the northern part through Dreux: these are the only roads of the first class. Of the second class are the Orléans road, passing just within the south-eastern boundary of the department, through Thoury; and the road which, branching off from the great south-western road at Chartres, runs through Courville Champrond and Nogent le Rotrou in the direction of Le Mans, Angers, and Nantes. Of roads of the third class are a road from Paris to Chartres through Guédelongroy, roads from Chartres to Dreux and to Orléans, and from Châteaudun to Nogent le Rotrou (and from thence to Alençon, in the department of Orne), and to Orléans. The other roads are bye-roads.

The department is divided into four arrondissemens that of Dreux, in the north, population in 1832 70,532; that of Chartres, in the east and centre, population 103,783; that of Châteaudun, in the south, population 59,758; and that of Nogent le Rotrou, in the west, population 44,747. These arrondissemens are subdivided into 24 cantons, or districts of justices of the peace, and 460 or 463 communes. The chief towns are Chartres, the capital, on the Eure, population 13,576 for the town, or 14,439 for the whole commune [CHARTRES]; Châteaudun, on the Loire, population 6461 [CHATEAUDUN]; Dreux, on the Blaise, population 5166 for the town, 6249 for the whole commune [DREUX]; and Nogent le Rotrou, on the Huine, population 5812 for the town, or 6825 for the whole commune Of this last and the smaller towns an account is subjoined.

In the arrondissement of Dreux we have Bu, Anet, Nogent le Roi, Le Tremblay, Châteauneuf, Digny, Senonches, Maillebois, Brezolles, and La Ferté Vidame.

Bu (population 1549, Dulaure, *Environs de Paris*, Paris, 1828) was once a place of considerable strength; it has still the ruins of an antient castle, of which one tower is in pretty good preservation. It was the capital of a county. Its markets are well attended.

Anet (population 1500, Dulaure) is in the northern extremity of the department, in a pleasant valley between the Vesgres and the Eure; it has the remains of a magnificent residence, built by Henri II. for Diane de Poitiers, duchess of Valentinois, his mistress. There are tan and corn-mills, and in the neighbourhood paper-mills and iron-works; the inhabitants carry on trade in corn, wood, and hay.

Nogent le Roi (population 1242, Dulaure) is in a pleasant valley on the left bank of the Eure. The inhabitants carry on a trade in cattle. Nogent belonged to Philippe VI. de Valois, who died here A.D. 1350. It is probable that it derived from this prince its distinctive epithet of Le Roi; it was, with its territory, erected into a county in favour of Bautru, one of the courtiers of the cardinal de Richelieu. The castle of Nogent, built on a hill which commands the town on the western side, was an object of frequent contest in the times of feudal warfare and in the wars of the English in France under their kings Henry V. and VI. It was garrisoned by Henri IV. in his war with the League, taken by the inhabitants of the neighbouring towns, who had embraced the party of the League, and to whom the garrison was an annoyance, and retaken by the royal forces.

Le Tremblay is very small; its population is under 500 (Dulaure); it lies a little out of the road from Dreux to Chartres.

Châteauneuf (population 1250, Dulaure) is in a fertile plain between Dreux and Nogent le Rotrou. Here was an antient castle, Castrum Theodemerense, a name which was corrupted into Thimer, and gave to the surrounding territory the name of Thimerais; whence Châteauneuf is sometimes distinguished as Châteauneuf en Thimerais. In A.D. 1589 it was taken by the troops of the duke of Mayenne and retaken by those of Henri IV. The inhabitants now carry on a trade in cattle.

Digny is not far from Châteauneuf, with a population, according to Dulaure, of 1197. Some of our authorities make this to be only a village.

Senonches and Maillebois are on the Blaise; the former near its source, the latter lower down. At Senonches (population 1911, Dulaure) steam-engines and hydraulic machines are made, and there are iron-works. Trade is carried on in cattle and horses. At Maillebois (750 inha-

bitants, Dulaure) woollen cloth and light woollen stuffs are made. Peat is dug in the neighbourhood.

Brezolles is on the Meuvette. Dulaure gives the population at 844. Trade in cattle is carried on.

At La Ferté Vidame (population 808, Dulaure), in the north-western part of the department, trade is carried on in horses and cattle. Some of our authorities make this to be only a village.

In the arrondissement of Chartres are Epernon, Maintenon, Gallardon, Guédelongroy, Auneau, Ouarville, Voves, Janville, Thoury, Illaire or Illiers, Courville, and Pont-gouin.

Epernon is on the high road from Paris to Chartres, in a delightful situation on the slope and at the foot of a hill, near the little river Guesle, a feeder of the Eure. It is tolerably well built: it was formerly walled in on three sides; on the fourth side (the north) it was defended by a castle on the summit of the hill, of which some picturesque ruins still remain. The country round consists of fertile meadows, watered by several brooks. The inhabitants (1462, Dulaure) manufacture leather: there are kilns for gypsum; and trade is carried on in flour, excellent pulse, horses, and cattle.

Maintenon is on the right bank of the Eure, at the junction of the Voise. It was erected into a marquisate in 1685, in favour of the widow Scarron, wife of Louis XIV., better known in history by the name, which she took from this town, of Madame (or rather La Marquise) de Maintenon. The Château de Maintenon was built by Jean Cottereau, intendant of the finances, and sold by his descendants to Madame de Maintenon: some portions of Cottereau's edifice may be observed in the present structure. The chapel of the château is scrupulously preserved: the tradition that Louis XIV. and Madame de Maintenon were married there appears from the testimony of history to be unfounded. The apartment of Madame de Maintenon retains a portrait of her. The grounds are large and well kept up; they are intersected in every direction by numerous canals, over which are no less than 50 bridges. The town itself, though well laid out and well built, presents nothing remarkable: the inhabitants (1542, Dulaure) carry on trade in cattle. Collin d'Harleville, a dramatic author of note, was born here. The aqueduct of Maintenon has been already noticed. Near the town is a plain covered with Druidical remains, called the stones of Gargantua.

Gallardon is on the right bank of the Voise, at the junction of the little brook the Ocre; it had antiently a castle: the town was several times taken and retaken in the wars of the English in France in the fifteenth century. Dunois, who took it from the English A.D. 1443, destroyed the castle except one tower, which still remains. Gallardon was taken by the Huguenots under the Prince of Condé, in the religious wars of the sixteenth century. The inhabitants (1398, Dulaure) carry on trade in corn, pulse, horses, oxen, calves, and sheep.

Guédelongroy is on the Voise. Vaysse de Villiers, who terms it a village, assigns to it a population of 500.

Auneau is on a small stream running into the Voise. It has the remains of a castle, probably built at the latter end of the fourteenth century. In this castle, in the religious wars of the sixteenth century, a body of German cavalry, in the service of the Protestants, were surprised by the royal troops, and in great part killed. What remains of the castle is used as a dwelling-house; at the entrance is a tower of very substantial construction, which commands the surrounding country. The inhabitants of Auneau (1400, Dulaure) manufacture hosiery.

At Ouarville (population 723, Dulaure) hosiery, and at Voves (population 1136, Dulaure) hosiery and light woollen stuffs are manufactured; and at Ouarville trade is carried on in horses and cattle. At Janville (population 986) hosiery and light woollen stuffs are manufactured; and at Thoury or Toury, near Janville (population 1232, Dulaure), hosiery and beet-root sugar; a trade in horses, asses, mules, and cattle is also carried on.

Illaire is on the left bank of the Loir, near its source: its population, in 1832, was 2059 for the town, or 2937 for the whole commune: the inhabitants carry on trade in cattle, sheep, and wool; and manufacture woollen cloths, white serge, and other light woollen stuffs, and hosiery: there are some tan-yards.

Courville and Pont-gouin are both on the left bank of the Eure, the first on the road from Chartres to Le Mans and Angers, the second on a road branching from this at Courville to Belême, Mamers, and Alençon. At Courville (population 1341, Dulaure) some trade in horses and cattle is carried on. The château which the descendants of Sully possessed in this town has been entirely destroyed; but that at Villebon, distant two or three miles from Courville, where that great statesman died, is yet in good preservation, and is one of the finest remains of the sixteenth century. At Pont-gouin (population 1400, Dulaure) white serge is made.

In the arrondissement of Châteaudun are Sancheville, La Ferté Villeneuve, Bonneval, Cloyes, and Brou.

To Sancheville, which is, according to some of our authorities, a village, Dulaure assigns a population of no more than 886. La Ferté Villeneuve is still smaller.

Bonneval is on the road from Chartres to Tours, in a pleasant fertile valley on the left bank of the Loir, which here flows in several channels. It was formerly a place of some strength. The parish church has a lofty spire. The inhabitants (1750, Dulaure) manufacture carpets, counterpanes, flannels, woollen stuffs, calicoes, and printed cottons; and spin cotton and woollen yarn. Trade is carried on in corn, flour, wool, and cattle; and there are some considerable tan-yards. There are some Druidical monuments in the neighbourhood of the town.

Cloyes is also on the road from Chartres to Tours, and on the Loir: it is a place of very little trade, with a population of about 1500. (Vaysse de Villiers.) Brou is on the Ozanne, which flows into the Loir: it had, in 1832, a population of 1870 for the town, or 2263 for the whole commune. The inhabitants make serges, and other light stuffs, and some of the fittings of weavers' looms. There are some marl-pits of considerable depth in the neighbourhood.

In the arrondissement of Nogent le Rotrou are Nogent le Rotrou, Authon, Beaumont le Chetif, Champrond, La Loupe or La Louppe, and Belhomer or Belhomert.

Nogent le Rotrou is on the road from Paris by Chartres to Le Mans, Angers, Nantes, and other places in the west of France, 33 miles from Chartres. It is a small town in a pleasant valley, watered by the Huine, on the left bank of which the town stands. It is a long place in proportion to its size. There is a castle, a picturesque ruin, which commands the town, and possesses some interest as having been the residence of Sully. There are three hospitals, one of them founded by Sully, who, as well as his wife, was buried here; but the tombs were violated during the Revolution, and the remains dispersed. The town had in 1832 a population of 5812, the commune of 6825: the manufactures are druggets, serges, and other light woollens, and cotton-yarn: there are several tan-yards, some tan-mills, and a dye-house. There are a public library, a high school, and an agricultural society.

Authon is near the source of the Ozanne: its inhabitants (1211, Dulaure) make serges, druggets, and other light woollens. Beaumont le Chetif (a village, according to some of our authorities) is between Brou and Nogent le Rotrou: its inhabitants (591, Dulaure) manufacture earthenware. Champrond is a village, according to some authorities, with 904 inhabitants (Dulaure), who trade in charcoal and wood. There are in the neighbourhood iron-mines, iron-works, and peat-pits. La Louppe and Belhomer are on the road from Dreux to Nogent: they are both small; Dulaure assigns to them a population of 1096 and 451 respectively. At La Louppe some business is done in horses, oxen, and sheep.

The department constitutes the diocese of Chartres, the bishop of which is a suffragan of the archbishop of Paris. It is comprehended in the jurisdiction of the Cour Royale of Paris, and in the circuit of the Conseil Académique of that city. It is in the first military division, of which the head-quarters are at Paris. It returns four members to the Chamber of Deputies. The state of education in the department is favourable as compared with the greater part of France. The number of male children at school is in the proportion of one for every seventeen inhabitants.

This department consists of the former district of Chartrain, and a portion of Dunois, both of which were comprehended in the county of Beauce or Beausse, and in the province of Orléanois; of a portion of Orléanois proper; of a considerable portion of the county of Perche, comprehended in the province of Maine; and of a small portion of the district Mantois, in the Ile de France.

EURI'BIA. [THECOSOMATA.]

EURI'PIDES of Athens is said to have been born at

Salamis in the year B.C. 480, on the day of the great victory obtained over the fleet of Xerxes. His father Mnesarchus and his mother Clito were among the refugees driven to Salamis by the progress of the invading army. They seem to have been Athenian citizens of the poorer class, as we find that the mean occupation of this poet's mother was made by Aristophanes one standing subject of the ridicule which he so perseveringly heaped upon him. Philochorus, on the contrary, says that he was of noble birth; but still his parents might be poor. (Suidas, Εὐριπίδης.) Euripides however found means to devote himself early and closely to the study of philosophy in the school of Anaxagoras, as well as to that of eloquence under Prodicus. While he was yet very young, the persecution and banishment of Anaxagoras appear to have deterred him from, or at least disgusted him with, the cultivation of philosophy as a profession, and combined with the strong natural bent of his genius to direct his exertions chiefly to dramatic composition. He is said to have commenced writing at the age of eighteen; and in the course of a long life he composed not fewer than seventy-five tragedies, or, according to other authorities, ninety-two, which rivalled in the public approbation the contemporary productions of Sophocles; and notwithstanding the constant and bitterly satirical attacks which, in the author's own time, they sustained from such as were exclusively and intolerantly attached to the elder tragic school, they secured him for all succeeding ages a place beside its two great masters. When upwards of seventy years old, weary, it should seem, of the feverish excitement in which he must have been kept alike by the petulant criticism and the turbulent applause that attended him at Athens, he accepted the invitation of Archelaus, king of Macedon, and went to live in honoured and tranquil retirement at his court. Here, however, a singular as well as tragical end awaited him. According to one account (for, in this as in many other matters of antient biography, there are discrepancies), he had spent three years in this retreat, when, walking one day in a solitary spot, he was met by some of the king's hounds, which, rushing furiously upon him, tore him so violently that he shortly after died in consequence of the laceration. Aulus Gellius tells us that the Athenians sent to Macedon to ask for the body of Euripides, but that the Macedonians constantly refused it, in order that their own country might retain the honour of the magnificent tomb which they erected for him at Pella, and which, according to Ammianus Marcellinus, was sanctified by the thunder-stroke, as Plutarch informs us had been the case with that of Lycurgus. Thus Athens was obliged to content herself with engraving the name of Euripides upon an empty monument, which in the time of Pausanias was yet standing beside the road from the Piræus to Athens (Pausan. *Attic.* 1, 2), near the tomb of Menander.

Of the numerous tragedies of Euripides, nineteen survive—a much larger proportion than has descended to us of the works of either of the two elder tragic masters. We have already [DRAMATIC ART, &c., vol. ix. p. 131] pointed out his 'Electra' to the reader's attention, not as a favourable specimen of the general powers of Euripides—for, indeed, as a work of art it is decidedly one of the least meritorious of his extant pieces,—but as affording the clearest point of comparison between his most prominently distinctive features as a dramatist and those of his two great predecessors; this being the only instance in which we have a piece from each and all of the three composed upon one and the same historical or mythological subject. 'Orestes,' the subject of which, inasmuch as it relates to the persecution of that hero by the furies of his mother and his proscription as a matricide, is the same as that of the 'Eumenides' of Æschylus, though in scene, incident, and character, excepting that of Orestes himself, they are wholly different, is more vigorous and more affecting than the 'Electra.' 'Iphigenia in Tauris' and 'Andromache' follow out still farther the fortunes of Orestes; both rank among those pieces of the second order in which the highest praise can be given only to certain portions. The same may be said of the six following pieces: the 'Troades,' the mournfully grand conclusion of which exhibits the captive Trojan women leaving Troy in flames behind them; 'Hecuba,' relating to the subsequent history of the captive queen; the 'Hercules Furens,' or 'Raging Hercules;' the 'Phœnissæ,' having the same historical groundwork as the 'Seven against Thebes' of Æschylus; the 'Heraclidæ,' which celebrates the Athenian protection of the children of Hercules, ancestors of the Lacedæmonian kings, from the persecution of Eurystheus; and the 'Supplices,' which in like manner commemorates the interment of the Seven before Thebes and their army, gained, on behalf of Adrastus, king of Argos, by a victory of the Athenians over the Thebans. 'Helen' is a very entertaining and singular drama, full of marvellous adventures and appearances, being founded on the assertion of the Egyptian priests that Helen had in fact remained concealed in Egypt, while Paris had merely carried off an airy semblance of her. The genuineness of 'Rhesus,' taken from the eleventh book of the 'Iliad,' has been much disputed, chiefly on the ground of its great relative inferiority—an argument which is outweighed by certain internal characteristics of the piece itself, combined with the external testimony of the antient writers ascribing it to Euripides. For beautiful morality and unaffected yet overpowering pathos, his 'Ion,' his 'Iphigenia in Aulis,' and above all, his 'Alcestis,' are peculiarly distinguished. He found subjects especially suited to the development of his finer powers in the purity and sanctity of the youth from whom the first of these three tragedies is named, in the unsuspecting innocence of the heroine of the second, and in the tender yet resolute devotedness of connubial affection portrayed in the third, to which Milton so beautifully alludes in his well-known sonnet, beginning

> 'Methought I saw my late espoused saint
> Brought to me like Alcestis from the grave,
> Whom Jove's great son to her glad husband gave,' &c.

The 'Hippolytus' and the 'Medea,' exhibiting all the romantic violence of irregular and vehement feminine passions, are deservedly celebrated among the greatest and most thoroughly successful achievements of this dramatist. In the former the heroism of Hippolytus is sublime as well as beautiful; and as regards the conduct of Phædra, as Schlegel has well remarked, it merits the highest commendation for the strict observance of moral propriety in a subject of so critical a nature. After the 'Hippolytus,' the same eminent critic is disposed to assign the next place among all the remaining works of Euripides to the 'Bacchæ,' on account of its harmonious unity, its well-sustained vigour, and of the appropriateness to the very peculiar subject here treated, of that luxuriance of ornament which Euripides constantly displays. This piece also merits especial attention as being the only one remaining of the *serious* dramas that were composed expressly and immediately in honour of Bacchus himself, the patron deity of the theatre. In this instance the glory and the power of Bacchus are not merely the occasion—they form the subject of the tragedy; and the wildly picturesque chorus of Bacchantes, as Schlegel observes, 'represent the infectious and tumultuous inspiration of the worship of Bacchus with great sensual power and vividness of conception.'

An interest yet more peculiar attaches to the 'Cyclops,' as being the sole remaining specimen of the *satyric* tragedy, so called from the chorus of satyrs, which formed an essential part of its composition. This, therefore, seems to be the fittest place in which to give a brief account of that particular and somewhat remarkable dramatic species. From this piece itself and from all collateral evidence, it is to be inferred that the satyric drama was never acted but as a kind of shorter and lighter after-piece, to relieve the minds of the audience, especially the ruder portion of them, after the grave impression of the serious performances: for which purpose, however, it seems to have been very constantly employed, each tragic trilogy being almost invariably accompanied by one of these shorter and lighter productions. Thus we find mention made of five satyric pieces of Æschylus, seven or eight of Sophocles, five of Euripides, besides a number of others by various minor authors. Notwithstanding its burlesque ingredients, the tragic character was so far preserved in the satyric play, that the subject appears to have been always historical, and the action partly serious, though with a fortunate catastrophe. No less than tragedy and comedy, the satyric drama had its peculiar and appropriate stage decorations, representing woods, caves, mountains, and other diversities of the sylvan landscape. Satyrs old and young, with Silenus in his various ages, were distinguished from one another by the variety of their grotesque masks, crowned with long shaggy goats' hair; while the satyrs were negligently clad in skins of beasts, and the Sileni decorated with garlands of flowers skilfully

woven." The satyr parts too appear to have been sometimes acted by pantomimic performers moving on a kind of stilts, to give more completely the appearance of goats' legs. The choral dance, it is hardly necessary to remark, was thoroughly rustic, peculiarly lively, and quite opposite in character to the solemn and impressive movements which accompanied the serious tragedy. The piece of Euripides has for its subject the adventure of Ulysses with Polyphemus, as related in the 'Odyssey,' with the addition of Silenus and his satyr band; the characters are accurately discriminated and consistently maintained; and the nature of the plot produces such natural contrasts and even blendings of the ludicrous with the horrible, as, above all things else, render this drama unique among the Grecian remains.

The editions of Euripides are numerous. The first edition, that of J. Laskaris, Florence, near the close of the fifteenth century, contains only the Medea, Hippolytus, Alcestis, and Andromache. That of Aldus, Venice, 1503, contains seventeen plays, among which is the Cyclops. Among subsequent editions are those by Canter, Antwerp, 1571; Barnes, Cambridge, 1694; Musgrave, Oxford, 1778; Beck, Leipzig, 1778-1788. The last complete editions are by Aug. Matthiä, Leipzig, 1813, and by F. H. Bothe, Leipzig, 1825. The editions of separate plays are also numerous; among which that of the Hecuba, Orestes, Phœnissæ, and Medea, by Porson, is the best known. Euripides has been translated into German by F. H. Bothe, and into English by Potter. There are also translations in German of several of the separate plays.

EUROPE is one of the great divisions of the globe, forming the north-western part of the old continent, of which it occupies a little more than two-seventeenths; Asia contains nearly nine-seventeenths, and Africa somewhat more than six. The surface of Europe is calculated to contain about 3,900,000 square miles, if Mount Caucasus and the river Ural are considered as forming the boundary-line between it and Asia.

The name 'Europe' first occurs in a poem attributed to Homer. Herodotus says he does not know how the name came to be given to our continent, except it be from Europa, the daughter of the king of Tyre; but he seems hardly satisfied with this explanation, and we have no other to offer. If the history of the discovery of America were lost we should have a similar difficulty in conjecturing how the New World obtained its name.

Europe is separated from America by the wide expanse of the Northern Atlantic, which washes its western and northern shores, and from Africa by the Mediterranean Sea. The boundary-line which divides Europe from Asia is only in part indicated by nature. This line runs through the Archipelago, the straits of the Dardanelles, the sea of Marmara, and the straits of Constantinople to the Black Sea, which is traversed by it. So far all geographers agree, but they do not agree as to the remaining part of the boundary-line. In the last century this line was drawn through the straits of Yenikale and the sea of Azof, and then along the river Don as far as the point where it approaches nearest to the river Volga, and afterwards along this river to its confluence with the Kama. It then followed the Kama to its sources in the Uralian Mountains, and was continued along the crest of this range to the source of the Kara, and thence along that river to the gulf of Kara.

This boundary-line is now abandoned as being too vague, and another is substituted for it. This new line traverses the Black Sea to the western extremity of Mount Caucasus, south of Anapa; it then runs along the watershed of this range, east-south-east to its eastern extremity, where it reaches the Caspian Sea at Soomgait, north of the peninsula of Absheran. Thence it runs through the Caspian Sea, which it leaves at the mouth of the river Ural, whose course it follows up to its sources in the Uralian Mountains. The Uralian Mountains and the river Kara constitute the remainder of this boundary-line.

The most northern point of the European continent is Cape Nord Kyn, in 71° 6′ N. lat.; North Cape, in 71° 10′, is on an island called Mageröe. The most southern points are Punta de Tarifa in Spain (36° N. lat.) and Cape Matapan (36° 17′) in Greece. The most western points are Cape St. Vincent (9° W. long.), Cape Roca (9° 28′), and Cape Finisterre (9° 27′). The most eastern point is in the Uralian Mountains, west of Ekatarinburg (60° 20′ E. long.). But some of the islands extend farther south and west than the continent. The most southern point of the island of Candia is 34° 55′ N. lat. The Blasket Islands on the west of Ireland lie in 10° 5′ W. long. Cape Fugleberg in Iceland is near 25° W. long., and the most western of the Azores, Corvo and Flores, 31° W. long. The most northern extremity of Nowaya Szemlia is about 77° N. lat. A straight line drawn from Cape S. Vincent to the mouth of the river Kara on the Frozen Ocean, the north eastern extremity of Europe, does not much exceed 3000 miles, and another drawn from Cape Matapan to Cape Nord Kyn, is 2400 miles long.

I. *Progress of Discovery.* The earliest notices of the history of Europe are in the writings of the Greeks, who inhabited the south-eastern corner of our continent. From this country the geographical knowledge of Europe extended by degrees to the west and north. Homer, who probably lived about 1000 years before the Christian æra, was acquainted with the countries round the Ægean Sea or Archipelago. He had also a pretty accurate general notion respecting those which lie on the south coast of the Black Sea; but what he says about the countries west of Greece, on the shores of the Mediterranean Sea, is a mixture of fable and truth, in which the fabulous part prevails. It would seem that in his age these seas were not yet visited by his countrymen, and that he obtained his knowledge from the Phœnicians, who had probably for some time sailed to these countries, but who, according to the common policy of trading nations, spread abroad false accounts of these unknown regions, in order to deter other nations from following their track and participating in the advantages of this distant commerce. It is probable also that the Phœnicians long excluded the Greeks from the navigation of the Mediterranean; for when the Greeks began to form settlements beyond their native country, they first occupied the shores of the Ægean, and afterwards those of the Black Sea. As the European shores of the Black Sea are not well adapted for agriculture, except a comparatively small tract of the peninsula of Crimea, their early settlements were mostly made on the Asiatic shores, and consequently little addition was made by these colonies to the geographical knowledge of Europe. But the navigation of the Phœnicians was checked in the middle of the sixth century before Christ, apparently by their country being subjugated by the Persians. About this time also the Greeks began to form settlements in the southern parts of Italy and on the Island of Sicily, and to navigate the Mediterranean Sea in its full extent. Accordingly we find that in the time of Herodotus (450 before Christ), not only the countries on each side of the Mediterranean Sea and the northern shores of the Black Sea were pretty well known to the Greeks, but that, following the track of the Phœnicians, they ventured to pass the Columns of Hercules, and to sail as far as the Cassiterides, or Tin Islands, by which name the south-western part of England must be understood. It is even reported that some of their navigators sailed through the English Channel and entered the North Sea, and perhaps even the Baltic. It must be observed however that Herodotus professes himself totally unacquainted with the islands called Cassiterides (iii. 115); and Strabo (104, &c.) expresses a very unfavourable opinion of the alleged northern voyages of Pytheas.

Thus a considerable part of the coasts of Europe was discovered, whilst the interior remained almost unknown. When the Romans began their conquests, this deficiency was partly filled up. The conquest of Italy was followed by that of Spain and the southern parts of France, and not long afterwards Sicily, Greece, and Macedonia were added. Cæsar conquered Gallia and the countries west of the river Rhine, together with the districts lying between the different arms by which that river enters the sea. His two expeditions into Britain made known also in some measure the nature of our island and its inhabitants. Thus in the course of little more than 200 years the interior of all those countries was discovered whose shores alone had been previously known. In the mean time nothing was added to the knowledge of the coasts, the Greeks having lost their spirit of discovery by sea with their liberty, and the Romans not being inclined to naval enterprise.

After the establishment of imperial power at Rome, the conquests of the Romans went on at a much slower rate, and the boundaries of the empire soon became stationary. This circumstance must be chiefly attributed to the nature

of the countries which were contiguous to the boundaries. The regions north of the Danube are mostly plains, and at that time were only inhabited by wandering nations, who could not be subjected to a regular government. Such at least are the countries extending between the Carpathian Mountains and the Black Sea; and therefore the conquest of Dacia by Trajan was of short continuance and speedily abandoned. The countries between the Alps and the Danube were soon added to the empire; but as the nations who inhabited the tracts north of that river had not yet given up a wandering life, they were enabled to elude the Roman yoke. The most important addition to the empire and to geographical knowledge was the conquest of England during the first century after Christ, to which, in the following century, the south of Scotland was added.

Nothing seems to have been added afterwards. The Geography of Ptolemy contains a considerable number of names of nations, places, and rivers in those countries, which were not subjected to the Romans. Probably they were obtained from natives, and from Roman traders who had ventured to penetrate beyond the boundaries of the empire. But these brief notices are very vague, and in most cases it is very difficult to determine what places and positions are indicated.

The overthrow of the Roman empire by the northern barbarians destroyed a large part of the geographical knowledge previously obtained, except perhaps as to that portion of Germany which was subject to the Franks, which by degrees became better known than it was before. But two sets of men soon made their appearance, who contributed largely to extend the geographical knowledge of Europe—missionaries and pirates. The Christian religion had been introduced into all the countries subject to the Roman power. The barbarians who subverted the empire soon became converts to the Christian faith, and some of them ventured among other barbarous nations for the purpose of converting them also. They visited the natives who inhabited the eastern parts of Germany, but here their progress was at first slow; they did not cross the river Oder, or at least they did not venture far beyond it, and the geographical knowledge of this part of Europe was consequently not much increased. The progress of those missionaries was more important who penetrated from Constantinople into the interior of Russia, where they succeeded in converting to the Greek church the different tribes into which the Russians were then divided. This was effected in the ninth century. In the tenth the western missionaries got into Poland, and its inhabitants by degrees became converts. In the beginning of the thirteenth century the Prussians and Lithuanians had not been converted to Christianity, and the attempts of the missionaries were for a long time abortive. Christianity was however introduced among the Prussians during the thirteenth century by force of arms, the knights of St. John having conquered the country. The Lithuanians were the last to embrace Christianity, which was effected by a stroke of policy: their sovereign acquired the crown of Poland by embracing the new faith.

To the pirates we are indebted for our acquaintance with the northern parts of Europe, especially the Scandinavian peninsula; but this was not owing to pirates who went to but to pirates who came from these countries. The Northmen or Normans, who inhabited Denmark, Norway, and Sweden, first laid waste and then settled in part of France, and afterwards conquered England. In their new settlements they maintained a communication with their native countries, which thus gradually became known wherever the Normans had settled.

It is worthy of remark, that no part of Europe has been discovered or explored by travellers who went for that sole purpose. We must however make an honourable exception in favour of Alfred the Great, who sent two noblemen to explore the countries around the Baltic Sea; and in the account of one of them, Other, or Otter, we find the first accurate notions respecting these regions, especially Prussia, more than 300 years before the Prussians were converted to Christianity.

II. *Surveys of Europe.* In the beginning of the last century trigonometrical surveys were first made with the view of constructing accurate maps. The first of these surveys was made in France under Cassini. Since that time other European governments have caused some parts at least of their respective territories to be surveyed, especially Prussia and Austria. England followed in the same steps towards the beginning of the present century, and to this great national undertaking we owe the publication of the Ordnance Maps. The southern parts of Sweden and Norway have likewise been surveyed. Thus we are now in possession of very exact maps of nearly one-half of Europe. The maps of the other countries of Europe rest on the partial surveys of particular districts, and on a greater or less number of astronomical observations; by means of which those parts which have not been surveyed can still be laid down within certain limits of accuracy. Though maps of this latter kind cannot altogether be relied on, the attention paid by all governments to their gradual improvement has been sufficient to correct very gross errors, and thus these maps have by successive and partial improvements attained a certain degree of correctness.

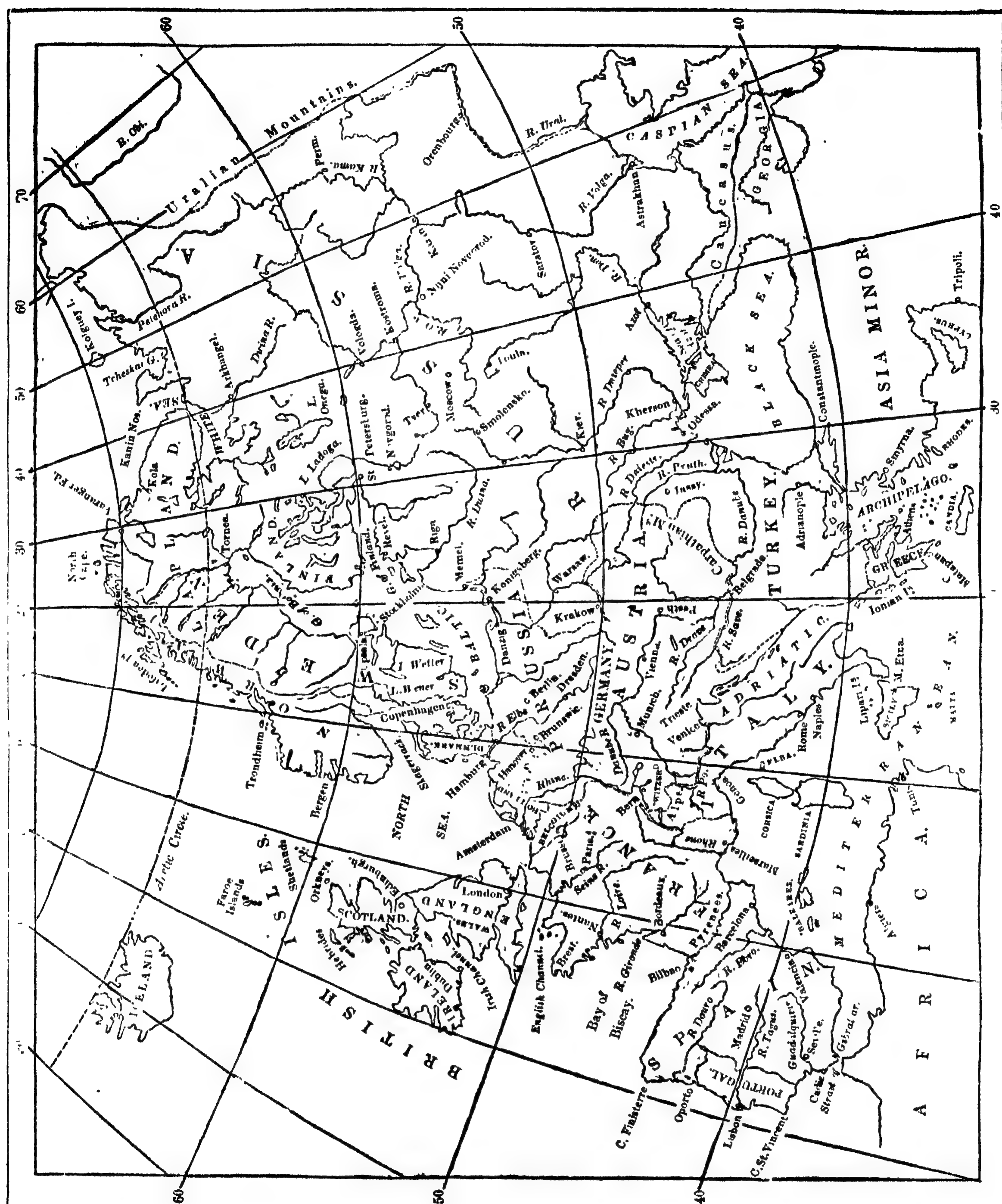
The great increase in commerce and navigation in modern times has convinced the respective governments of Europe of the necessity of a minute and accurate survey of their coasts. But all the coasts of Europe have not been surveyed, though more than half of them have been accurately laid down. The greatest part of the coast of Iceland has been surveyed by the Danish government, and this survey is still going on. The whole western coast of Norway, and east of Cape Lindesnaes, as far as the harbour of Christiansand, was surveyed by the Danes fifty or sixty years ago, but this survey is not considered accurate. The Baltic, including the Kattegat, has been surveyed by the governments to which the coasts belong, but not minutely, nor is the survey considered accurate. The coast between the mouth of the river Elbe and the Dollart was surveyed by the French, and continued to the Schelde by the Dutch. The coast between the Schelde and Gravelines was surveyed by the French, while the English ascertained the outer dangers.

Our government has shown great activity in surveying the British coasts. A minute and accurate survey has been made of the whole eastern coast of Great Britain south of the Murray Frith, and of the whole southern coast, except the tract between Sidmouth and Plymouth. The western coast, including the Bristol Channel, has been surveyed as far as Bardsey Island, and again between Holyhead and Liverpool. Farther north only the Solway Frith is partly surveyed. The coast of Ireland has been surveyed between Dublin Bay and Donegal Bay, inclusive, along the northern shores of the island. The Shetland and Scilly Islands, as well as Guernsey, Jersey, Alderney, &c., have been surveyed completely, but the survey of the Orkneys is not yet terminated.

The coast of France has been surveyed by the French government from the Strait of Dover to Bayonne, except a part of the coast of the Bay of Biscay from about Belle Isle to the Isle of Ré. Most of the harbours on the coast of Spain have been minutely surveyed by the Spanish government.

Most of the islands in the Mediterranean have been surveyed; Corsica and Elba by the French, Sicily and Sardinia by the English. The survey of the Adriatic has been completed by the Austrians and English co-operating. From the Adriatic to the Archipelago the coast has been surveyed by the English, and they have also carried on a survey through the islands and coasts of the Archipelago, which is nearly completed.

III. *Physical Geography.* Nearly two-thirds of the surface of Europe consist of an immense plain; the remainder is partly mountainous, and partly hilly. The plain occupies the east part of the continent; and the hilly and mountainous countries extend along its western and southern shores. On the eastern boundary the plain extends across the whole continent from south to north, from the mountain-range of the Caucasus and the shores of the Black Sea to those of the Arctic Ocean. In width it extends in this part of the continent from the Ural Mountains to 26° E. long. To the west of this meridian it terminates on the north on the shores of the Baltic, and in the mountain-region of Scandinavia; on the south it continues along the southern shores of the Baltic, and extends even farther west to the shores of Holland opposite the British Islands. If small eminences are not taken into account, it may even be said to continue in a south-west direction through Belgium and the northern parts of France to the banks of the Seine, where it terminates between Paris and the mouth of the river. The portion of the plain, west of the meridian of 26°, is narrowed on the south by the Carpathian Mountains, and other ranges which



are connected with them. Towards the eastern part it extends over ten degrees of latitude, but in its progress towards the west it becomes gradually narrower, partly owing to the mountains advancing farther north, and partly also owing to the seas which form its northern border running farther to the south. Here its mean breadth does not exceed three degrees of latitude, except where the peninsula of Jutland joins it. Along the coast of the North Sea it is still narrower.

By this narrow portion of the Great European Plain and the Baltic (which may be considered as its lowest part, being covered with water), the mountain-regions which constitute the western portion of the Continent are divided into two separate systems. To the north lies the system of the Scandinavian Mountains, and to the south what we shall here call the South European Mountain System.

The Great Plain occupies about 2,500,000 square miles, the South European Mountain Region 1,100,000, and the Scandinavian Mountain System about 300,000 square miles.

Scandinavian Mountain System.—This comprehends the whole of the Scandinavian peninsula, or Sweden and Norway. A line drawn from the mouth of the river Torneo, at the most northern angle of the Gulf of Bothnia, to the Waranger Fiord, a bay of the Arctic Ocean, would separate it from the north-western part of the Great Plain. A huge mountain-mass occupies the west part of this peninsula. It rises on the very shores of the sea to a height of some hundred feet, and attains, at a short distance from it, an elevation of 3000 or 4000 feet, and frequently more. South of 63° N. lat. it has not the form of a mountain-range, but of a mountain-plain, its surface frequently presenting a perfect level, and in some places swelling into hills. This elevated plain is from 100 to 150 miles across, and as it attains in many parts the line of perpetual congelation, which in this latitude is about 4200 feet above the sea, a great portion of

it is always covered with snow; while other districts, where the snow melts during several weeks in every year, afford pasture-ground. On the plain there rise a small number of summits, among which the Skagstölstind attains 8400 and the Sneehätten 8200 feet. The western side of the plain is indented by deep inlets of the sea, which penetrate from 30 to 60 miles, and even more, inland: the eastern side is furrowed by narrow and deep valleys, of nearly the same length.

North of 63° N. lat. the masses of rocks take the form of a high ridge, the summits of which however rarely extend more than a few miles, and frequently present a sharp-edged crest. Their ascent on the side towards the Atlantic Ocean is rapid and frequently precipitous, a character which increases as we advance farther north, because the highest part of the range gradually approaches the ocean till it constitutes its very shores. The highest summit is the Sulitelma, which rises to more than 6000 feet; but many other parts exceed the snow-line, which varies between 2000 and 3000 feet, and towards the north sinks much lower.

The country to the east of this range, and at the base of it, is more than 1000 feet above the sea, and descends towards the Gulf of Bothnia in long slopes, interrupted by small level plains, and intersected here and there by ridges of hills, running in the direction of the slopes, and approaching in some parts to the shores of the gulf.

Mount Sylthfiellen is on the northernmost extremity of the mountain plain, where it begins to contract to the dimensions of a range. It stands near 63° N. lat., and attains the height of 6486 feet above the sea. From it, as from a common centre, branch off several ridges to the east, south-east, south and south-west, and though they soon sink down to hills, they continue through the south-eastern part of the peninsula, the mean elevation of which is from 300 to 400 feet above the sea, and above which the hills rise a few hundred feet. The Scandinavian ridges enclose the great lakes of Mälarn, Wenern, and Wettern. To the south of the last lake these ridges unite, and form the table-land of Småland, whose surface is on an average about 500 feet above the sea, and which constitutes the most southern extremity of the Scandinavian system. It descends with a gentle slope towards the east, but very rapidly to the south and west. The peninsula of Scania, which joins it on the south, is low and flat.

The Färoe Islands, which are between Norway, Cape Wrath in Scotland, and Iceland, and nearly equidistant from these three countries, resemble in their conformation the rocky plain of South Scandinavia, rising abruptly from the sea to more than 1000 feet, and presenting on their summits, at an elevation of more than 3000 feet above the sea, generally a level surface. This seems also to be the case with the south-eastern part of Iceland, which is called the Klofa Yökul, where a surface of more than 8000 square miles has never been explored, probably owing to the thick layer of snow which has accumulated on a mountain-plain which rises above the snow-line (3000 feet). The western and northern districts of Iceland, which in general rise only to a moderate elevation, though some isolated ridges and summits attain the snow-line, seem to be the produce of that active volcanic agency which has frequently laid waste this portion of Iceland.

Though the Scandinavian Mountains are not visibly connected with the South European Mountain system, we may perhaps be excused in considering the island of Great Britain as forming such a link. The most northern part of Scotland lies in the same parallel with the southern part of the Scandinavian mountain-plain, and bears a considerable resemblance to it in configuration, consisting of one enormous mass of high rocks, which rise abruptly from the sea, and exhibit on their surface extensive plains, sometimes flat and sometimes diversified with eminences. These plains however are not covered with snow, as they do not rise above 2000 feet, and sometimes attain only 1000 feet, or a little more, an elevation which falls considerably short of the snow-line. This description is applicable to the whole of Scotland north of the Central Grampians (57° N. lat.), with the exception of the greater part of the counties of Caithness and Aberdeen. Even to the south of 57° N. lat. we meet with an elevated plain, about 1000 feet above the sea, which, under the name of the Moor of Rannoch, extends more than thirty miles in every direction between Ben Cruachan and the southern chain of the Grampians. But farther south the Scandinavian character of the country is lost, and the surface presents the broken character of ridges, valleys, and plains, by which the most northern portion of the South European mountain system is distinguished. This character of the country softens gradually as we proceed farther south. Between 57° and 54° N. lat. the plains are generally of small extent, and a great number of summits rise to 1000, 2000, and sometimes even to 3000 feet and upwards above the sea. South of 54° N. lat. however these lofty elevations, and the comparatively narrow valleys which accompany them, occur only along the western coast of Great Britain, in Wales, and the counties of Devon and Cornwall. East of the Severn the hills do not generally rise so high as 1000 feet, nor are their slopes abrupt; the whole surface consists of gentle swellings and slopes, with wide levels between them. Towards the North Sea it sinks down entirely, and forms (with few interruptions not worth mention in this general survey) a great plain, which occupies the counties of Lincoln, Cambridge, Huntingdon, Norfolk, Suffolk, and Essex. As these flats lie opposite to the western extremity of the Great European Plain, one might imagine that they are a continuation of that plain, and that in the island of Great Britain the three great systems which occupy Europe have their representatives. South of the Thames the country resumes its undulating surface, and approaches in its form to those districts of France which extend along the southern shores of the Channel.

South European Mountain System.—This system, which extends over the whole of South Europe, from Cape La Roca in Portugal to the Straits of Constantinople, presents a surface more diversified in its form than any other portion of the globe of equal extent, China perhaps excepted.

To give greater perspicuity to our description, we shall follow the natural division made by a valley which traverses the whole of this mountain-system from north to south, between 4° and 8° E. long. In the northern part of the valley flows the Rhine from Basel northwards, in the southern the Rhone from Lyon southwards. The middle portion of the valley is occupied by the vale through which the Saone, a tributary of the Rhone, and the Doubs, a branch of the Saone, have their course. The most northern bend of the Doubs lies nearly under the same parallel as Basel, and less than thirty miles from it. In this part there occurs a great depression in the mountains, which divide the Rhine from the Doubs, and the French government have taken advantage of it, by carrying through this depression a canal, which is called the Rhone and Rhine canal, and which unites the Doubs to the Ill, a tributary of the Rhine. The highest part of this canal is nearly 1760 feet above the sea.

In the region which lies west of this long transverse valley, nature has effected another natural division, by forming across the continent a wide plain, skirting the northern side of the Pyrenees, and extending from the Bay of Biscay to the Mediterranean. The western part of this plain is low and flat, and drained by the river Garonne; the eastern is traversed by low hills, but does not rise much higher than the western part. The canal of Languedoc, which is made through this portion of the plain, and unites the Garonne with the Mediterranean Sea, attains at its greatest elevation about 600 feet above the sea.

South of this plain the mountain-chain of the Pyrenees rises with a rapid ascent, and runs across the whole continent from the Bay of Biscay to the Mediterranean. In its central parts it attains a mean elevation of about 6000 or 7000 feet, but a much less height towards its two extremities. The highest summits are upwards of 11,000 feet high, as the Mont-perdu (11,282), the Maladeta (11,500), and there are many more which exceed 10,000 feet. The southern declivity runs out in long mountainous slopes, intersected by deep valleys, and terminates on the banks of the river Ebro. Not far from the western extremity of the Pyrenees another chain branches off, which may be considered as its continuation, since it runs directly to the west. As far as 6° W. lat. it is a single chain, with short offsets, but west of that meridian it divides into several ranges, which traverse the north-western part of Spain in different directions, and terminate respectively at the capes of Ortegal, Finisterre, and Silleiro. This chain, which may be called the Cantabrian range, rises in its eastern parts to about 4000 or 5000 feet, but west of 5° W. lat. it attains a height of 5000 or 6000 feet, and even more.

South of these ranges extends the table-land of Spain, the highest parts of which occur between 1° and 4° W. long., where they are from 2000 to 2500 feet above the level of

the sea. The country east of this line descends rapidly, but in high chains of hills, which contain some mountain summits, to the Mediterranean. On the highest part of the table-land also, a few high mountains occur, as the Sierra Urbion, which rises to 7272, and the Sierra Molina, to 4500 feet, but they do not form continuous chains. The country west of them is a plain, which presents a large extent of level ground, in some places a hilly surface, and in others ridges about 1000 feet above their base. Such are the ridges which divide the basin of the river Tajo from that of the Guadiana. But between the Tajo and the Duero the dividing ridge rises to 5000 or 6000 feet, and attains in the Sierra de Gredos even the elevation of 10,548 feet. In its continuation towards the Atlantic is the Serra d'Estrella, 7524 feet high; and even the Serra do Junto, not far from its termination at Cabo da Roca, is 2319 feet above the sea.

The Sierra Morena, which divides the basins of the rivers Guadiana and Guadalquivir, forms the southern boundary of the table-land. It does not however rise much above it, the mean elevation of this range varying between 3000 and 4000 feet. South of the Sierra Morena the country sinks considerably to the valley of the Guadalquivir, which, in its upper part is only about 1000 feet above the sea, and in its lower course traverses an extensive level plain, which, near the sea, is covered with swamps.

This valley is divided from the Mediterranean by a long chain of mountains running east and west, a considerable part of which is always covered with snow, and has therefore received the appropriate name of Sierra Nevada. The highest summits occur between 3° and 4° W. long., and are the Cerro de Mulhacen (11,660 feet high), Cerro de Machos (11,096), Cerro de Veleta (11,387), Cerro de Caldera (10,793), and Cerro de Fajos Altos (10,778). Many other summits exceed the snow-line, which, in this latitude, is about 9000 feet above the sea.

The country between the plain of the Garonne and the valleys of the Rhone and Rhine presents a different character. It contains also an elevated region, rising to between 2000 and 3000 feet above the level of the sea. But this region is of comparatively small extent, being included between 44° and 46° N. lat., and between 1° and 4° E. long. On its surface rise three chains of mountains, which enclose the valleys of the Allier and of the Upper Loire. The most western part is called the mountains of Auvergne, the middle the mountains of Forez, and the eastern range the Cevennes. The mountains of Auvergne, which exhibit unequivocal signs of volcanic origin, rise in Mount Cantal to 6090 feet, in Mont d'Or to 6200, and in Puy de Dôme to 4840 feet. The country west of them continues high and hilly, but gradually declines in elevation as far as the source of the Charente, from which point to the sea it extends in a low and level plain. The mountains of Forez rise in the Pierre Haute to 6200, and in the Mount Magdalene to 4800 feet. The two chains terminate about 46½° N. lat., near the town of Moulins, on the Allier: the country extending to the north and north-west of them has an undulating surface, resembling that of the southern counties of England; it varies from 200 to 300 feet above the level of the sea, and does not exhibit ranges of hills, except in the south of Normandie and in Bretagne, where the hills rise from 1000 to 1500 feet above the sea.

The Cevennes, which separate the valley of the Upper Loire from that of the Rhone, rise in Mount Mezin to 5820 feet, in Mount Pilate to 3516 feet, and in Mount Tarare to 4756 feet. South of 47° N. lat. they sink down to the level country, and through the depression thus formed runs the Canal du Centre. North of this canal the chain rises again, but to a less elevation, and is here called the Côte d'Or, which, between 47° and 48° N. lat., terminates in a hilly plain, called the Plateau de Langres. On this plain, which may be about 1000 feet above the sea, several of the rivers of France take their rise, and among others the Seine. From the north-eastern part of this plain issues a chain of low hills, called Monts Faucilles, which, at 48° N. lat., extend eastward till they meet the higher range of the Vosges mountains, which rise in the Ballon de Sulz to 4560 feet. The chain of the Vosges runs parallel to the Rhine and terminates at a short distance from the town of Mayence, in the Mont Tonnerre, or Donnersberg, 2656 feet high. West of this chain, as far as the Côte d'Argonne (a range of high hills which issues from the western extremity of the Monts Faucilles, and separates the valley of the Meuse from the sources of the eastern tributaries of the Seine), extends a rugged country, intersected by valleys and chains of hills, running in a northern direction, and terminating in the Ardennes and the Eifel, which are hilly and rugged plains, about 1800 feet above the level of the sea, occupying the space between the Meuse and the Rhine as far north as 50½° N. lat. West of the Côte d'Argonne extend the dry chalk-plains of Champagne, which gradually subside in the level country which occupies the north of France (the departments of Seine and Marne, Aisne, Oise, Seine Inférieure, Somme, Artois, and Nord), and joins that of Belgium. On this plain only a few hills, and those of very moderate elevation, occur at considerable intervals.

We pass now to that portion of the south European mountain system which lies to the east of the valleys of the Rhone and of the Rhine. Here we find the mountain system of the Alps, which extend from the banks of the Rhone as far east as 18° E. long., and cover an immense tract of country, measuring on an average about 130 miles across. The Alps may be divided into the Higher and Lower Alps. The Higher Alps extend to about 13° E. long., and the Lower between 13° and 18°.

The Higher Alps have the form of a quadrant, beginning on the shores of the Mediterranean, and running first due north, but gradually declining to the east, until they run due east, in which direction about one half of their course continues. Their mean breadth does not exceed 100 miles. Many hundred summits, perhaps not less than a thousand, rise above the snow-line, which here is found at somewhat more than 8000 feet above the sea. The highest summits are Mont Blanc (15,748 feet), Mont Rosa (15,170), and Mont Cervin 14,778 feet above the sea. The valleys by which these mountains are intersected are narrow, and sink down to 2500 and 2000 feet, and still lower.

The Lower Alps do not rise to so great an elevation, few of the summits attaining the snow line; the highest summit is Mont Terglou, near the sources of the Save, which is 9380 feet above the sea. But the space occupied by these mountains widens considerably as they proceed eastward; between 15° and 16° E. long. they are upwards of 200 miles across, and fill up the whole country between the Adriatic Sea and the Danube. They form also several chains running east and west, between which there are wide longitudinal valleys. East of 16° E. long., where they approach the mountain system of the Balkan, they narrow to about 80 miles, and continue to run along the Adriatic Sea.

The Alps descend with a rapid slope southward to the plain of Lombardy, which extends from the western part of the Higher Alps to the Adriatic. Its length is about 250 miles, with an average breadth of about 50. Its western and higher districts are about 400 feet above the sea, but it gradually subsides as it advances east, till it terminates in a low sandy shore. It is mostly a dead flat, of great fertility, and very well cultivated.

South of this plain extend the Apennines, a mountain-range which, at its western extremity, joins the most southern part of the Higher Alps, and runs in one chain eastward along the plain of Lombardy, from which it rises with a steep ascent. It afterwards turns south and traverses, in different chains, the peninsula of Italy, terminating at its most southern extremity, the Capo dell'Armi, on the straits of Messina, with the Monte Aspro, 5300 feet. The highest part of this range is between 43° and 42° N. lat., where the Monte Corno or Gran Sasso d'Italia rises to 9510 and the Monte Sibilla to 7200 feet. The valleys, which are included between its several ranges, are wide and fertile In some places the mountains do not extend to the shores of the sea, but leave spacious plains, as is the case along the Adriatic, north of 44°, and again between 42° and 43°. The latter plain, called the Tavogliera de la Puglia, is a savanna, without trees, and of very indifferent fertility. Along the Mediterranean occurs the plain of Terra di Lavoro, in which the town of Naples and Mount Vesuvius are situated, one of the most fertile spots of Europe or the world. Many of the mountainous districts along the Mediterranean are covered with lava.

The Island of Sicily, which is separated from Italy by the strait of Messina, has a hilly surface. Along the northern coast there runs a chain of low mountains, which, in Mount Madonia, rise to 3788 feet. Unconnected with this chain is the volcano of Mount Ætna, which attains an elevation of 10,800 feet above the sea. Between the hills, with which Sicily is studded, and sometimes on their very tops, there

are plains of moderate extent, which are sometimes nearly .000 feet above the sea.

The island of Sardinia consists of two chains of mountains running north and south, and an elevated valley between them. The eastern chain, which is the higher, rises in Mount Schimschiu to 6000, and in the Lyubarra mountains to 5768 feet. The western chain probably does not exceed 3000 feet in elevation. Along the coast there are some low swampy tracts.

The island of Corsica is still more mountainous. If a few small tracts along the eastern shores are excepted, which are covered with swamps, it is everywhere studded with high hills and ridges of mountains. Some of the summits attain a great height. Monte Rotondo is 9060, and Monte Paglia Orba 8691 feet above the sea. The valleys are numerous but very narrow, and of indifferent fertility.

Passing to the countries north of the Alps we find that this great mountain-system, at its western extremity, is bounded on the north by the river Rhone, from the point where it issues from the lake of Geneva to its junction with he river Saone. Immediately north of the Rhone there rises another chain of mountains, different in character and n elevation, called the Jura. This chain extends from the banks of the Rhone, in a north-east direction, to the river Rhine, on whose banks it terminates between the mouth of the river Aar and the town of Basel. Its length may be about 160 miles, and its width less than 20 on an average. It consists of a number of parallel ridges, rising 1000 feet and more on a base which is nearly 3000 feet above the sea. Some of the summits exceed 5000 feet in absolute elevation. The highest are towards the southern extremity of the range. The Pré des Marmiers attains 5640, Reculet 5619, and the Dôle 5500 feet.

Along the south-east side of the Jura, and between it and the Alps, extends the plain of Switzerland, beginning on the shores of the lake of Geneva and terminating on those of the lake of Constance. This plain is between 1250 and 1350 feet above the level of the sea. At each extremity some hills rise to a considerable height, but the central districts exhibit only a strongly undulating surface. Its length may be about 180, but its width does not exceed 20 miles.

Opposite the northern extremity of the Jura, but on the northern banks of the Rhine, rises the Black Forest, a mountain-range, about 20 miles across, which runs parallel to the Rhine, and whose western sides approach the river sometimes within three or four miles. It terminates on the banks of the river Neckar. Its length may be between 130 and 140 miles. The upper part of this range extends in wide plains more than 3000 feet above the sea; the number of summits which rise above these plains is not great. The Feldberg attains 4912 feet, and the Kandel 4160 feet above the sea. The Odenwald, which extends between the Neckar and Mayn, in the same direction, may be considered as its continuation, but it does not attain an equal elevation, its highest summit, the Katzenbuckel, rising only to 2000 feet.

Between the Black Forest and the Odenwald on the east, and the Vosges mountains on the west, lies the valley of the Rhine, which is about 20 miles in width, but the length from Basel to Mayence is not less than 200 miles. At its upper extremity it is 800 feet, but at its lower hardly more than 400 feet above the sea. This valley presents a level surface of great fertility.

The Rhine, below the great cataract of Schafhausen, is not more than 1000 feet above the level of the sea; but the Danube, at Danaueshingen, nearly under the same meridian, is 2200 feet above it; yet between both rivers no mountain-range occurs. With only a hilly surface, and in an extent of hardly 15 miles, the country rises more than 1200 feet. This hilly country may be considered as the commencement of the elevated plain of Bavaria, which extends from the foot of the Alps (about 47½° N. lat.), between the Black Forest and Odenwald on the west and the Böhmerwald (forest of Bohemia) and Fichtelgebirge on the east, to the Thüringer Wald and the Rhöngebirge (51° N. lat.). The length of this plain is about 180 miles, and its breadth about the same. The western part of the plain, which joins the Black Forest, is hilly, and intersected by a mountain-ridge, called the Rauhe Alp, which runs along the northern bank of the Danube for 70 or 80 miles, with a mean width of about 16 miles. South of this ridge the country is nearly 2000 feet above the sea, but north of it less than 1000 feet. The eastern part of the plain, south of the Danube, is nearly a level, which sinks gradually and almost imperceptibly from the foot of the Alps towards the river. The town of Munich, which nearly occupies its centre, is 1664 feet above the sea, and Ratisbon, on the Danube, more than 1000 feet. That part of the plain which lies north of the Danube has an undulating surface, upon which some hills rise towards the banks of the river Mayn. From the banks of the Danube the country rises slowly, but hardly more than 150 feet above the river, when it forms the water-shed between the Danube and Mayn, and begins to subside towards the bank of the last-mentioned river, where it is only from 600 to 800 feet above the sea.

The elevated plain of Bavaria does not extend far enough north to reach the Great Plain, being divided from it by a mountain-region which extends between 50½° and 52° N. lat. over the whole of Germany, from the very banks of the Rhine to the Fichtelgebirge and Erzgebirge. This region, which has a width of about 100 miles, contains a great number of ridges, bearing different names. Their mean elevation is about 3000 feet, and the highest summits attain upwards of 4000. The most northern of these ridges is the Harz. For a more peculiar account of them we refer to GERMANY.

The countries which we have hitherto considered are to the north of the Higher Alps. To the north of the Lower Alps, and divided from them only by the narrow valley of the Danube, is another system of mountains, which encloses, in the form of a quadrilateral figure, the kingdom of Bohemia, and might therefore be called the Bohemian mountains. The several ridges of which it consists have different names. They attain a mean elevation of 3000 or 3500 feet above the sea; their highest summits rarely exceed 5000 feet. The great valley of Bohemia, which is enclosed by these ridges, is subdivided into numerous smaller valleys by the lower ridges, which advance into it from those which surround it. Near the higher ridges the surface of these valleys is 1500 feet and upwards above the sea, but they subside rapidly towards the middle of the great valley, where they are not more than 700 and 900 feet above the sea. Where the Elbe carries off the waters of Bohemia it is somewhat less than 400 feet above the sea.

At the eastern extremity of this mountain-system, where the rivers Oder and Morava take their origin, the Carpathian Mountains commence. They run first due east, then decline to the south-east, and when in that direction the range has passed 26° E. long., it turns suddenly to the west, and having proceeded in that direction to 23° E. long. it gradually declines to the south, and terminates on the banks of the Danube on both sides of the meridian of 22°. The length of this range does not fall much short of 800 miles; its breadth is not very considerable, in a few places only exceeding 70 or 80 miles. Its mean elevation may be between 3000 and 4000 feet; but in two places it rises much higher: Tatra Mount, which is intersected by 20° E. long., is an enormous mass of rock, about 50 miles long and 30 wide in the central parts, whose surface is about 7000 feet above the sea. Above this huge mass there rise about ten peaks which exceed 8000 feet. The highest is the Peak of Lomnitz, which rises to 8675 feet above the sea. The Peak of Eisthal (dale of ice) is 8640, and the Krywan 8150 feet high. Elevated summits occur again on the most southern part of the range, where the Buzesd attains 8700 feet, and Mount Surul 7572 feet. Towards the great plain, and on the north and east, the range sinks with gentle slopes, forming no offsets, except a few short ones at the sources of the rivers Pruth, Serith, and Suezava, between 47° and 48½° N. lat. But some considerable offsets occur towards the two extremities of the range. Four chains are detached from it between 18° and 20° E. long., which run southward and terminate not far from the banks of the Danube, after traversing the north-western part of Hungary: they are comprehended under the general term of Hungarian Ore Mountains, from their being rich in gold and silver ore. The valleys between them are wide and fertile. No considerable chain branches off from the middle part of the range, but from its eastern extremity four or five ridges issue: these ridges running in a western direction some hundred miles, traverse Transylvania, and render the whole of this country a succession of mountains and wide valleys, which are generally very fertile.

Between these offsets of the Carpathians on the east, the principal range, and the Hungarian Ore Mountains on the north, and the eastern termination of the Alps (16° E. long.), lies the plain of Hungary, the most extensive that is

included within the South European mountain-system. It extends from north to south about 300 miles, and its mean breadth is not less. The Danube traverses it. To the west of the Danube is a small range on the plain, the Bakony Mountains, which rise in their highest part somewhat more than 2000 feet; and farther south (near 46° N. lat.), the hills of Fünfkirchen occur: but both these ranges occupy only a small surface. The plain east of the Danube is a dead flat. That portion which lies west of the Danube is fertile, as well as that which skirts the Hungarian Ore Mountains, but by far the greatest part of it is either covered with sand or swampy, and affords only indifferent pasture. This great plain towards the south is only 300 feet above the sea, but towards the north it rises to 400 and 450 feet.

South of the Carpathian Mountains, and between them and the lower course of the Danube, extends the plain of Wallachia, 250 miles in length from west to east, and about 100 miles in breadth. It is generally level, but towards the mountains undulating; in its lower parts along the Danube it is only about 100 feet above the sea. It is of great fertility, but in many places swampy.

The third great division of the South European mountain-system is formed by the Balkan, which, with its numerous branches, traverses the most eastern of the three great southern peninsulas, which advance from the body of the continent into the Mediterranean Sea. The Balkan range is not disjoined from the Alps by any natural separation, but is so closely connected with them as to form a continuation of that mountain-system. Geographers have however assumed a dividing line about 18° E. long.

From this line the principal range of the Balkan runs in a south-east direction till it reaches 22° E. long., from which point it continues in a general due east direction till it terminates on the shores of the Black Sea in Cape Eminch. The length of this chain may be about 600 miles. Its elevation is considerable west of 24° E. long., especially between 22° and 24° E. long., where a great part of the chain, called here Shardagh (Scardus) and Egrisu Dagh, is covered with perpetual snow, which shows that it must rise at least to 9000 feet. East of 24° E. long. it does not rise so high, and it is supposed that in this part its mean elevation varies between 3000 and 4000 feet. The extent of country covered with this range and its numerous branches is very great. West of 24° E. long., all the immense tract which lies between the Save and Danube on the north and the Adriatic as far south as Cape Linguetta or Karaburnu, presents nothing but a continuous succession of high mountains and generally very narrow valleys, and is probably the most rugged part of Europe, as it is certainly the least known. The country which lies between the great range and the Danube, east of 24°, is only mountainous near the foot of the range, for its offsets rapidly decrease in height, and subside as they approach the river, on the banks of which the country exhibits merely an undulating surface.

From the southern side of the Balkan three ranges branch off: the eastern, which leaves the principal range about 70 or 80 miles from the Black Sea, is called Strandja or Stanches Dagh, and runs south-east, parallel to the Black Sea, but gradually approaching it. About 50 miles west of Constantinople, it turns to the south, and terminates at the mouth of the river Maritza. The latter portion is called Tekir Dagh. Both parts are of moderate elevation. The second range branches off from the Balkan east of 24° E. long., and runs first south-east till it approaches the Ægean Sea, within 20 or 30 miles, when it turns east and terminates nearly opposite the Tekir Dagh, on the banks of the Maritza. This chain, called Dispoto-Dagh, rises to a considerable elevation, though none of its summits seem to attain the snow-line.

The country between the Strandja Mountains, the Dispoto Dagh, and the Balkan is only mountainous towards the two last-named ranges; the greater portion of it rises only into hills, separated from one another by wide valleys, which in several places spread out into plains of moderate extent. This country possesses great fertility, and is one of the finest parts of Europe.

The third and most considerable range, which branches off from the Balkan on its southern side, since no modern name has been assigned to it, may be called by the antient denomination of Pindus. It leaves the principal range near 22° E. long., and runs south, forming the watershed between the rivers which fall into the Adriatic and those which empty themselves into the Ægean Sea. It may be considered as terminating south of 39° N. lat. with Mount Veluchi (7657 feet high). The length of this chain is upwards of 200 miles; and the greatest part of the upper range is for eight or nine months, and some summits probably the whole year round, covered with snow.

The country between this range and the Adriatic is very mountainous: it generally consists of high ranges and deep and narrow valleys, though in some places there are elevated plains of moderate extent, as that on which the town of Joannina (or Yanina) is built, which probably is at least 1500 feet above the sea.

The countries to the east of the Pindus range are less mountainous. That portion which extends north of 40° N. lat. contains high summits and ridges near the great range; but as it approaches the sea the mountains subside into hills, and the valleys widen by degrees into plains. Mount Athos, or Hagion Oros, is an isolated mass which terminates the most eastern of three projecting tongues of land, and rises to the height of 6349 feet.

Near 40° N. lat. a lateral chain branches off from the Pindus range. It is called Volutza Dagh and runs east, terminating near the sea in Mount Olympus, which attains the height of 6520 feet. Near 39° N. lat., between Mount Itamo (5789 feet high) and Mount Veluchi (7657), two lateral chains branch off to the east and terminate respectively on each side of the Gulf of Zeitoun. In the northern range, called by the Greeks that of Othrys, the Ieracovouni rises to the height of 5670 feet. In the southern range, known among the antients by the name of Oeta, the Katavothron rises to 7070 feet. Between the Othrys, the northern of these two ranges, and the Volutza Dagh is the plain of Thessaly, celebrated from the most remote antiquity for its beauty and fertility. Though it extends nearly 60 miles from north to south it is much narrowed by hills, which advance from the neighbouring ranges 15 or 20 miles into the plain, and on the sea side it is shut in by a barrier of mountains.

The country south of the Oeta range and the Gulf of Arta is mountainous in its western districts, but farther east it assumes a more undulating surface, though some of its numerous elevations rise to the height of mountains, as Mount Parnassus, which is supposed to rise to 6000 feet, and several others are perhaps not much lower.

Round the lake of Topolias, the antient Copais, there is an extensive plain, whose surface is several hundred feet above the sea level and walled in on the east by the high mountains which line the western margin of the Euripus. Some of these mountains are above 2000 and others above 3000 feet high.

The peninsula of the Morea is united to the continent by a rocky isthmus which in one part contains a considerable depression, across which several attempts were made in antient times to cut a canal. The Morea preserves the character of the countries which are dependent on the Balkan, being very mountainous, especially in its eastern parts, where several lofty ranges run in a south-eastern or southern direction. Mount Zyria, the Cyllene of the Greeks, seems to be the knot where the ranges unite. Cyllene is 7744 feet high, but the Pentedaktylon (Taygetus), in the southern part of the peninsula, rises to 7920 feet. The central districts of the peninsula contain some elevated plains which are probably as high as the interior of Spain. Tripolitza is 2224 feet above the sea, and Madrid, according to Bauza, is 2222 feet above the same level. In the western dis-districts the mountains gradually subside into hills; and several plains of moderate extent occur along the bay of Koron and the banks of the Alpheius.

The mountains of the island of Eubœa, which lies parallel to the coasts of Attica and Eubœa, belong to the mountain system of Othrys and of Oeta, from which it is separated on the north and west by those prodigious fissures which form the sea-valleys or channels of Trikiri and the Euripus.

The Great Plain.—Beginning at its western extremity, we find that between the mouths of the Schelde and the Elbe, the country hardly in any place rises to more than 100 feet above the sea. Its surface is covered with a succession of moors and heaths, ill adapted for agriculture, except in the alluvial tracts along the rivers. But this sterile country is surrounded by fertile marshes, which run along the shores of the North Sea, and are so low that it is

necessary to defend them by dykes from the invasion of the waves. The width of these marshes varies from one to four or five miles, except at the western extremity, where they occupy the whole of the province of Holland. Towards the banks of the Elbe the soil mostly consists of sand, but it begins here to be covered with forests.

The countries between the Elbe and the Vistula are more fertile, though the sandy soil prevails, especially towards the north; yet even here extensive tracts of fertile land occur. Towards the mountain region which borders on it on the south, especially in Silesia and the southern districts of Poland, the country may be considered as rather fertile. No marshes occur along the Baltic, but at the south-western extremity of this sea a series of small lakes begin which run parallel to the shore and follow its sinuosities. Their distance from the sea is about 50 miles, and they are situated on the highest part of the plain, perhaps at a mean elevation of 150 feet. They form the watershed between the small rivers which fall into the Baltic and those which run southwards into the interior of the plain.

That portion of the plain which we have so far noticed is drained by rivers which originate in the mountain-region south of it and traverse it in a north-western or northern direction. But east of the upper branches of the Vistula, the rivers originate in the plain itself which they drain. These rivers run either north-west and north to the Baltic and White Seas, or south and south-east to the Black and Caspian Seas. The watershed which separates their sources begins about 23° E. long. on the northern declivity of the Carpathian Mountains, in a range of hills which separate the Saan, a branch of the Vistula, from the sources of the Dniester. This range of hills runs in a north-eastern direction to the sources of the Bug, another tributary of the Vistula, where it turns north, and is lost in the plain. It is soon replaced by an immense swamp, the largest in all Europe. The principal body of this swamp covers nearly the whole basin of the river Priepec, which extends about 200 miles east and west, with an average breadth of 100 miles. It also continues northward, but with a much diminished width, between the sources of the Niemen, Beresina, and Vilia, and terminates on the banks of the Düna, south of Dünaburg and Polotz. The surface covered by this swamp is perhaps not inferior to that of England. Some parts of it are wooded. We do not know what is the elevation of this swamp above the level of the sea, but we may conjecture that it is not less than 300 feet. Towards the northern extremity of the swamp the watershed turns due east, and is here formed by an undulating country which separates the upper courses of the rivers Düna and Dnieper. But where it approaches the sources of the Volga it turns first north-east and then north, and here it is overtopped by steep and rocky hills, called the Hills of Waldai, which rise highest in the neighbourhood of that town, where they attain an elevation of 1200 or 1300 feet above the sea. This seems to be the highest point of the watershed. It continues in a northern direction till it passes 60° N. lat. between the lakes of Onega and Bielo Osero, and then turns south-east to the sources of the Suchona, the principal branch of the Dwina: thence it proceeds in an east-north-east direction to the sources of the Petshora, which falls into the Arctic Sea, and of the Kama, a branch of the Volga, where it terminates in the Uralian range. That portion of the watershed which is east of the hills of Waldai is covered with an immense forest, called the Forest of Volkhonsky.

The country north of the watershed is, in general, of moderate fertility; there are some districts which are covered with sand, while others have a rich soil. That series of small but very numerous lakes which we noticed in the western part of the plain continues in this at nearly the same distance from the Baltic, forming likewise a subordinate watershed. East of 22° E. long. however it stretches farther inland, approaching the northern extremity of the great swamp, and then continues north of it along the watershed to the hills of Waldai, [illegible] still farther in the Forest of Volkhonsky, where it terminates near 35° E. long.

The country north of 60° N. lat. is only in a few places fit for agriculture, partly on account of its cold climate, and partly on account of the sterility of the soil. That portion which lies west of the lake of Onega is rocky, and is mostly traversed by ridges of rocky hills, which lie in a north and south direction. These hills rise in some places to 500 or 600 feet above the sea. Most of them, as well as the level country between them, affords excellent pasture ground. This region is remarkable for its numerous large lakes, which cover nearly one-fourth of its surface, and are connected by short natural channels. The largest of these lakes are the Ladoga, Onega, Saïma, and Enara.

There are only a few lakes east of the lake of Onega. It appears that the watershed here rises to a greater elevation, and that the slope of the country is more regular. Its southern districts are still covered with forests, and a few spots are cultivated; but its northern districts extend in immense plains, covered with moss, which by attracting the water of the melting snow renders them impassable for the greatest part of the summer. A few rocky ranges of hills occur on this plain, but we are not acquainted with their direction and elevation.

By far the greater part of the Great Plain extends to the south of the watershed. Contiguous to its southern declivity extends a country of great fertility, from 300 to 400 miles in width. It begins on the west near the foot of the Carpathian Mountains, and terminates on the east where the Volga begins to run south-south-west. The parallel of 49° forms its southern boundary, as far east as about 40° E. long., whence it runs in a north-eastern line to the town of Simbirsk on the Volga. The town of Moskwa, situated nearly in its centre, is 480 feet above the sea. The country east of the Volga, as far as the Uralian range, is mostly covered with hills, and is even mountainous, being traversed by the offsets of the great range: it is of moderate fertility in the valleys, which are frequently wide. The hills and lower parts of the mountains are covered with forests.

To the south of this region extend the deserts which are called the Steppes. They may be divided into the Higher and Lower Steppes, the line of separation between them being the high ground which extends north and south between the Don and Volga. The Higher Steppes occupy the western part of the plain, extending south of the fertile region to the very shores of the Black Sea. Their elevation above the sea may be between 150 and 200 feet. They are without trees, produce only in some places a few shrubs, and are overgrown in the early part of the summer with a coarse grass, which affords very indifferent pasture. In the latter part of the summer and autumn their dry brown surface shows no sign of vegetation. Agriculture can only be carried on in the narrow bottoms along the rivers. The peninsula of the Crimea is connected with them by a low isthmus. Three-fourths of its surface resemble the Lower Steppes; but on its southern shores rises a mountain-range, whose highest summit, the Chatyr Dagh, is 5040 feet. The valleys of this range are fertile.

The Lower Steppes are at the eastern extremity of Europe, extending between the southern extremity of the Uralian range and Mount Caucasus along the banks of the river Ural, and on both sides of the lower course of the Volga. They occupy a space more than twice as large as the area of the British Islands. The southern part is lower than the level of the sea, the Caspian Sea being more than 300 feet beneath it, and the adjacent country rising very little above its shores. The town of Saratow on the Volga, more than 300 miles from the Caspian, is not above the sea-level. We do not know how much higher the northern districts of these steppes rise, nor if their soil differs from that of the southern, which are covered with a fine sand, intermixed with shells, producing no trees nor shrubs, but at certain seasons a scanty grass. This soil is strongly impregnated with saline matter, and most of the lakes which occur here contain such a quantity of salt that it crystallizes in summer, and supplies the greatest part of the inhabitants of Russia. In no part of these steppes are any traces of agriculture visible except in the neighbourhood of Astrakhan.

We shall conclude this general survey of Europe by observing, that the Uralian range, which runs about 1500 miles, first south and then south-south-east, rises in its highest summit, the Pawdinskoi Kamen, to more than 6800 feet above the sea; that the Lower Steppes extend east of the river Ural far into Asia; and that Mount Caucasus, though only few of its summits attain the snow-line, rises in its highest summit higher than the Alps, Mount Elboorz attaining an elevation of 16,800 feet.

Looking at the map of Europe we find that its coast-line is formed alternately by wide projecting promontories and deep bays, which divide them from one another. This peculiarity has led a large proportion of its inhabitants to a

sea-faring life, and as the winds and weather in the waters that surround this continent are not regulated by the seasons of the year, but are subject to continual changes, this circumstance has given to them that boldness in maritime enterprise which forms the most distinguishing feature in their character, and raises them above most other civilized nations of the globe.

Europe, in fact, considered by itself, is only a large peninsula, which is further cut up into a great number of smaller peninsulas by the interior seas and gulfs which penetrate far inland into the main mass of the peninsula; consequently, in proportion to its surface, it presents a much greater extent of coast than any other of the great divisions of the globe, as will appear by the annexed table, which however must be considered only as a rough approximation:—

	Surface in square miles.	Coast-line. Miles.	Ratio of one mile of coast-line to area in square miles.
Asia	18,000,000	35,000; or including the islands, 40,000.	500; or including the islands, 420.
Africa	14,000,000	16,000	900
Europe	3,900,000	20,000	195
America	15,000,000	32,000 (without the coast of the Arctic Sea).	470

The Atlantic Ocean, with which all the seas that wash the shores of Europe are connected, except the Caspian (and this is rather to be considered as an immense inland lake), forms the Bay of Biscay between Cape Finisterre and the island of Ushant; the English Channel between the northern coasts of France and the southern coasts of England; St. George's Channel, between Great Britain and Ireland; and the North Sea, which separates Great Britain from the Netherlands, Germany, Denmark, and Norway. The North Sea might be considered a closed sea, as it is united on the south to the great expanse of the Atlantic only by the straits of Dover, which, between the South Foreland in Kent and Cape Grisnez in France, is only eighteen miles wide, and by the comparatively narrow channel called the English Channel, if it were not on the north connected with the Atlantic by the open and wide expanse of sea which separates North Britain from Norway.

The close seas, which are united to the Atlantic by straits, are the White Sea, the Baltic, and the Mediterranean; with the latter the Black Sea and the Sea of Azof are connected.

The White Sea, the smallest of these inland seas, covers an area of only about 40,000 square miles. The strait by which it is connected with that portion of the Atlantic which is called the Arctic or Icy Sea, is about 200 miles long, and of considerable width, its narrowest part being from 30 to 40 miles across. This sea is entirely or partially covered with ice during four or five months of the year. Into its eastern part the Dwina falls; and into the wider part of the strait the river Mezen.

The Baltic is connected with the North Sea by a channel with about 80 or 90 miles of average width; this channel branches off from the North Sea in an east-north-east direction, but afterwards suddenly turns south. That portion which is connected with the North Sea and extends to the east-north-east is called Skagerack, or the Sleeve by the British sailors, and the other part, which lies south and north, the Cattegat. At the southern extremity of the Cattegat are the three straits by which the Baltic is entered like three gates. The Sound, between Zeeland and Sweden, is the passage generally taken by vessels; it is at the narrowest place only about two miles wide. The Great Belt is in the middle between Zeeland and Fünen, and eight miles across at the narrowest place. The Little Belt, which is only three-quarters of a mile wide where narrowest, separates the island of Fünen from the peninsula of Jutland. The Baltic forms three great gulfs—those of Riga, Finland, and Bothnia. Receiving, by the numerous rivers which fall into it, great masses of fresh water, it is less salt than the Atlantic. This circumstance, and the small depth of its waters, sufficiently explain why ice is formed nearly every year along its shores, and the navigation is interrupted for three or four months.

The Mediterranean is connected with the Atlantic by the strait of Gibraltar, which is about ten miles across. It is the largest of the close seas which wash the shores of Europe, but it receives the drainage of a comparatively small portion of its surface; the number of rivers which fall into it is very considerable, but few of them run 100 miles. Evaporation carries off a larger portion of its waters than is supplied by the rivers which flow into it, and there is accordingly a strong current setting continually through the straits of Gibraltar. A motion of its waters towards the east is proved by vessels requiring a greater time to sail from the coast of Syria to Gibraltar than from Gibraltar to Scanderoon. Its waters are salter than those of the Atlantic. It also forms several large gulfs; as, on the European side, the Bay of Lyon, that of Genoa, the Adriatic, and the Ægean Sea, or Archipelago. By means of this sea the Straits of the Dardanelles (one mile across where narrowest), the Sea of Marmara, and the channel of Constantinople (six furlongs across at the most narrow place), the Mediterranean is united to the Black Sea, from which a constant current pours through the narrow straits into the Ægean. [Eubœa.] The Black Sea is connected by the strait of Yenikale with the Sea of Azof. It is less salt than the Mediterranean, and its northern shores in winter are frequently fringed with ice.

The Caspian Sea, whose north-western shores only are included in Europe, is the largest of the numerous seas without an outlet which occur in the north-western regions of Asia. Ice is formed every winter along its northern shores. Its waters are salt, but only in a slight degree.

Seas.	Extent. sq. miles	Specific gravity of its waters.
Mediterranean	760,000	1.0293
Black Sea and Sea of Azof	190,000	1.0142
Caspian	180,000	
Baltic	160,000	1.0400
White Sea	40,000	1.0190
Atlantic Sea, in the northern hemisphere		1.0283

When we consider these seas as the receptacles of the drainage of the adjacent countries, we find that those towards the east have the most extensive basins. The basin of the Caspian Sea, though it is only drained by two large rivers, the Volga and the Ural, occupies a surface of 850,000 square miles, as far as it belongs to Europe, and runs with its northern boundary along the parallel of 60° N. lat. The basin of the Volga, the largest of the rivers of Europe, contains an area of above 750,000 square miles. The basin of the Black Sea is somewhat larger. Its south-western boundary is formed by the principal range of the Alps; its north-western by a line drawn from Switzerland to Moscow; and another line from this city to the mouth of the Volga, forms its north-eastern border. Its area in Europe is rather more than 900,000 square miles. The countries which are comprehended in the European part of its basin are drained by the Danube, Dnieper, Dniester, Don, and Kuban, and their tributaries. The basin of the Baltic is nearly equal in extent, including the Cattegat and Skagerack, being on all sides surrounded by countries which belong to Europe; their basin extends over a surface of nearly 900,000 miles, though perhaps none of its rivers rise more than 350 miles from its mouth in a straight line. The great rivers which fall into the Baltic are the Oder, Vistula, Niémen, Düna, Newa, and the numerous rivers descending from the Scandinavian range, as the Tornea-elf, Calix-elf, Lulea-elf, Pitea-elf, Scaleftea-elf, Umea-elf, Angerman-elf, Indals-elf, Liunga-elf, Ljusna-elf, and Dal-elf; and likewise the Götha-elf, and Glommen, which fall into the Cattegat and Skagerack. The basin of the White Sea is drained by the Dwina, the Mezen, and Petshora, and some other smaller rivers, and occupies a surface of about 400,000 square miles. Though the coast-line of the Atlantic from Cape North Kyn to Cape Tarifa, comprehends the whole of the shores of the western declivity of Europe, including the British islands, its basin probably does not much exceed 600,000 square miles. No considerable river flows into the Atlantic between Cape North Kyn and the mouth of the Elbe. Into the North Sea there flow the Elbe, Ems, the Rhine, Schelde, and of the rivers of Great Britain, the Spey, Tay, Forth, Humber, and Thames; into the English Channel, only the Seine; into St. George's Channel, the Severn; into the Bay of Biscay the Loire and Garonne; and immediately into the Atlantic the Clyde, the Shannon, the Duero, Tajo, Guadiana, and Guadalquivir. The basin of the Mediterranean, including the Archipelago, is by far the

smallest of all those which belong to the inland seas of Europe, comprehending only about 250,000 square miles. The largest of its rivers, the Rhone, flows only 500 miles, including its bends. The other rivers, which are of a considerable length, are the Ebro in Spain; the Po and Tiber in Italy, and the rivers of Albania and the Maritza in Turkey. All the rivers which drain the basins of the Mediterranean and Atlantic Sea rise in the South European mountain region; those which fall into the Black Sea rise within the Great Plain except the Danube and its tributaries, which drain about one-third of the mountain region. The rivers which run to the Caspian rise partly on the watershed of the Great Plain, and partly in the Uralian range; and the same is the case with those that drain the basin of the White Sea. The rivers which flow from the east into the Baltic rise on the Great Plain; those which flow into it from the south rise on the edge of the mountain region; and those which fall into it from the north descend from the Scandinavian range.

Climate.—The climate of Europe presents great differences, if we compare it with that of those countries in other divisions of the globe, which lie within the same parallels. It is a well-established fact, that the eastern coast of North America is much colder than the western coast of Europe, under the same latitudes. This difference is in some places equal to 10° of latitude. Thus we find that the mean annual heat of London (51° 31′ N. lat.) is nearly 50° Fahr., while at Quebec (46° 48′ N. lat.) it hardly exceeds 42° Fahr. At Lisbon (38° 43′ N. lat.) it is 61½° Fahr., and at Williamsburg in Virginia (37° 5′ N. lat.) only 56° Fahr. It is however worthy of remark, that the eastern countries of Europe, especially those north of the Black Sea, are much colder, and approach in climate those of the eastern coast of America. At Moscow (55° 47′ N. lat.) the mean annual heat is not quite 38° Fahr., whilst at Edinburgh (55° 58′ N. lat.) it exceeds 47° Fahr.

This difference in the climate of Europe may perhaps be explained by the circumstance that this continent is enclosed on most sides by seas whose water is warmer than that of the ocean at large. The water of the Mediterranean is from 4° to 5° Fahr. warmer than the ocean without the straits. Between America and Europe the warm water of the gulf stream, which exceeds the heat of the other water of the Atlantic by 8° or 10° Fahr., covers a surface not inferior to that of the Mediterranean, and the exhalations of this immense expanse of warm water are carried by the prevailing western and south-western winds to the western shores of Europe. Besides this, the water in the sea between Spitzbergen, Greenland, and the coast of Norway indicates a higher degree of temperature when drawn from some depth under the surface of the sea than on the surface itself. This has been proved by the experiments of Sir John Franklin and Captain Scoresby, though the contrary is the case in all other seas, as far as we know.

Dr. Brewster however thinks that there are two frigid poles in the northern hemisphere, and that the degree of warmth increases with the distance from the meridian in which these poles are situated. By comparing the few exact meteorological observations which have been made in remote countries, he is induced to infer that these meridians are about 90° from the western countries of Europe, and hence he presumes we may account for the greater mildness of the climate in these regions. The observations which the latest traveller through the north of Asia, Dr. Erman, has made in those remote countries, seem rather to confirm than to contradict the theory of Dr. Brewster.

With respect to climate, Europe may be divided into three zones, the northern, the central, and the southern. These zones may be separated from one another by two lines, of which the northern begins near 60° N. lat., on the western coast, and terminates between 55° and 54° N. lat. on the Uralian range on the east; the southern commences about 48° N. lat. on the west, and terminates on the east at the mouth of the Danube (45° N. lat.). In the northern zone only two seasons occur, summer and winter, the former lasting about three months (June, July, and August), and the latter nearly nine months. These seasons are separated by a spring and autumn of a few days, rarely two weeks' duration. In summer the heat is very great, and the vegetation inconceivably rapid. The winter is severe and boisterous, and brings down immense quantities of snow. In the central zone the four seasons are distinct, and the passage from heat to cold and *vice versâ* is very gradual. The heat is less than in the northern zone, and so is the cold during the winter; still frost prevails during two, three, or four months, and snow is common except on the coasts. In the southern zone frost is either not felt at all or only during a few days; and snow is of rare occurrence, or it does not lie on the ground for more than a few days. Vegetation accordingly is very little interrupted. But the countries within this zone have abundant rains during the last three months of the year, and are subject to great and long droughts in summer. These droughts frequently continue for four or five months, and in some places occasionally for eight or nine months.

IV. *The Man of Europe.*—Nearly the whole population of Europe belongs to that race which is comprehended under the name of the *Caucasian* race; but along the Uralian range, and at the most northern extremity of the continent, a few nations occur which belong to the Mongolian race; to which must be added the Magyars, who inhabit nearly the centre of Europe (Hungary).

The inhabitants of the Caucasian race may be divided into three great branches and several smaller ones, if we consider them with reference to their language. The first division comprehends those languages which are derived from the Latin and an admixture of the languages of the antient aborigines and of the later destroyers of the Roman empire. These languages are spoken in the peninsulas of Italy and Spain and in the countries west of the valley of the Rhine. They are the Italian, Spanish, Portuguese, and French languages. In some districts of the countries where these languages are spoken there still exist the languages of some of the aboriginal inhabitants of Europe. On both sides of the western extremity of the Pyrenean mountains, south and west of the river Adour, the Basque language is spoken by a population not exceeding 600,000 souls, according to the most exact computation. The Cymric language is spoken in Wales, and also in the interior districts of the most north-western peninsula of France, which is called Bretagne (Little Britain), by a population amounting to about 2,000,000 individuals. The most extensive of these languages is the Celto-Gaelic language, which is still prevalent in the greater part of Ireland, and in some of the northern districts of Scotland. The number of the individuals who speak it perhaps does not fall short of 7,000,000. Many persons think that the Cymric and Celto-Gaelic languages ought to be considered only as dialects of the same original language.

The second great branch of the languages is formed by those of Teutonic origin. These languages are spoken by the inhabitants of England, a great part of Scotland and Ireland, Iceland, Norway, Sweden, Denmark, Germany, and the Netherlands. In every one of these countries a pecular dialect is spoken, though the affinity of all these languages cannot be questioned. It would seem as if these languages had been introduced into these countries by their first inhabitants, or aborigines, as at present no other language is spoken in any of these districts (with the exception of the British islands), nor do we find any mention in historical records of such other languages ever having existed.

The third great family of languages is comprehended under the name of Slavonian. The most western tribes that speak these languages are found in the eastern districts of Germany. The Czekes inhabit Bohemia, and the Wendes the north-western part of the Prussian province of Silesia. In the south-western part of the same province Polish is spoken. Between Vienna and Trieste is another Slavonian tribe, also called Wendes, or Windes by the Germans; but they call themselves Slovenzi. Towards the south the Slavonian language extends to the very summit of the Balkan, the inhabitants of Dalmatia, Croatia, Slavonia, Bosnia, Servia, and Bulgaria, speaking dialects of that language. From these extreme points the Slavonian language is spoken over the whole of the great plain of Europe to the borders of Asia, on the Uralian range, and on the river Ural. The most extensively spoken languages of this family are the Russian and the Polish.

In the immense tract of country in which the Slavonian language may be considered as prevalent, some extensive districts are occupied by nations who speak different languages. We shall first notice the tribes of Mongolian origin, who form three different groups. The most numerous tribe are the Magyars, who inhabit the greatest part of the Hungarian plain, especially that portion which lies east of the Danube, from the banks of which river they extend to the foot of the Carpathian mountains, where they

are on every side surrounded by Slavonian tribes. The second group of nations of Mongolic origin occupy the countries between the Scandinavian Peninsula on one side, and the White Sea and the three great lakes of Ladoga, Onega, and Peipus on the other side. The Laplanders inhabit the country between the northern extremity of the Gulf of Bothnia and the White Sea; the Finns occupy the country farther south, as far as the Gulf of Finland. At the most eastern part of this gulf live the Inghers, and south of it the Esthonians and the Livonians, who extend to the southern part of the Gulf of Riga. All these nations speak dialects of the same language, which is said to have a great resemblance to the language of the Magyars. The third group of the Mongolian tribes occupy the countries along the Uralian range, and between the rivers Ural and Volga. The most northern tribe are the Samoyedes, who occupy the eastern portion of the government of Archangel, between the river Metzen and the Uralian range. South of them, in the eastern districts of the government of Wologda, are the Siryanes, who also occupy the northern part of the government of Perm. In the southern districts of this government are the Permiens, the Wogules, and Wotyakes. Here are also a few families of the Mordwines, Cheremisses, and Chuwashes, who are dispersed over the surface of the governments of Viatka, Kasan, Simbirsk, and Pensa, where they inhabit an extensive district on the western side of the Volga. Their neighbours on the other side of the Volga are the nomadic tribes of the Calmucks and Kirghises. The former occupy the countries contiguous to the Volga, on its eastern bank; but the Kirghises inhabit those between the rivers Useon and the river Ural. The two latter tribes are Bhuddists. To these tribes are still to be added the Bashkirs, who, in their stature, and the conformation of their face, evidently show their Mongolian origin, though they speak a Turkish dialect. They inhabit the most eastern part of Europe, the northern portion of the government of Orenburg, and some districts of that of Perm, on both sides of the Uralian range.

Different both from the Mongolian languages, and those of the Slavonian tribes, are the languages spoken by the Lithuanians and Courlanders, two small nations who inhabit the countries between the rivers Niemen and Düna, and extend over the northern districts of eastern Prussia and the Russian governments of Grodno, Minsk, Wilna, and Mitau.

The Wlaches, or inhabitants of Wallachia and Moldavia, speak a peculiar language, with which a great number of Latin words are mixed up. Hence it is inferred that their ancestors inhabited these countries when they were subject to the Roman empire.

The eastern peninsula of southern Europe is inhabited by nations who speak three different languages. The most numerous are those who speak the Turkish language, which is used by the Osmanlis or Turks, and the Tartars. Some tribes of the latter nation are also dispersed among the Slavonian nations, on the northern shores of the Black Sea, where they are known by the names of the Nogai Tartars and Meshtcheryakes. They are most numerous in the Crimea, and along the northern declivity of the Caucasus. The Osmanlis form the bulk of the population in those parts of Turkey which lie between the Balkan and the Volutza range. The mountainous countries west of the Pindus range are inhabited by the Albanians, who speak a peculiar language, and are considered as the descendants of the Illyrians, the aborigines of these countries. The most southern part of the peninsula is inhabited by the Greeks, who form the bulk of the population in Greece, and also in that portion of Turkey which lies between the Volutza and Othrys ranges. Their language does not differ substantially from the antient Greek, of which it is a corrupted form, mixed up with some Latin, Italian, Turkish, and other foreign words.

The population of Europe is calculated to amount to about 230 millions in round numbers. The Christian religion is that which generally prevails. The Catholic faith is nearly exclusively professed by the inhabitants of Portugal, Spain, and Italy, and also by the majority in France, Austria, Bavaria, Poland, Belgium, and Ireland. Catholics are also numerous in some cantons of Switzerland, and some provinces of Prussia and of Russia. The whole number of the adherents of this faith is calculated to amount to 112 millions. To the Greek church belong the Russians and the Greeks; and a great number of the members of this church are dispersed over different parts of Turkey: they amount altogether to about 54 millions. The inhabitants of Sweden, Norway, and Denmark are nearly exclusively Protestants; and the various sects of Protestants form the great majority in England, Scotland, Holland, Switzerland, Prussia, and the northern and western states of Germany. In France, Austria, Ireland, Belgium, and some provinces of Russia, Protestants are numerous. The whole number is about 52 millions. There are Armenians in Russia, Austria, and Turkey; about 200,000 in all.

The Turks and Tartars, with some of the small tribes of Mongol origin along the Uralian Mountains, are Mohammedans. Their number is supposed not to fall much short of six millions. Among the Laplanders and Samoyedes there are still some who have not embraced Christianity. The Calmucks and the Kirghises are mostly Bhuddists. At Astrakhan there are a few Hindoos. The Jews are most numerous in some parts of Russia, Poland, Austria, and Turkey. Their number cannot be accurately estimated. In the south-eastern countries of Europe there is a considerable number of gypsies: it is doubtful what their religion is.

The following is a tabular view of the sovereign states of Europe in 1837. The areas and population are given from the latest and best authorities, and, wherever they could be got, from official documents. It is hardly necessary to observe that these figures must be considered only as approximations with respect to several of the states of Europe, such as Turkey and Greece, for instance.

Those thus marked * are states which are members of the Confederation of Germany.

States.	Form of Government.	Area. Sq. miles.	Population.
Andorra (Pyrenees)	Republic, with two syndics and a council	190	15,300
*Anhalt-Bernburg	Duchies, with states having limited powers	336	45,500
*——— Cothen		310	36,400
*——— Dessau		357	57,600
*Austria, Empire of 1, in Germany, Hungary, &c.;	Absolute monarchy, with the exception of Hungary and Transylvania, which have legislatures	237,334	29,600,000
2, in Italy		17,892	4,500,000
*Baden	Grand duchy; limited sovereignty, with legislature of two chambers	5,712	1,240,000
*Bavaria	Limited monarchy; two chambers	28,435	4,300,000
Belgium	Do.	12,569	4,230,000
*Bremen	Republic; senate and convention	67	57,800
Britain, Great, Ireland, and settlements and islands in Europe	King and two houses of parliament	116,700	25,300,000
*Brunswick	Duchy; limited sovereignty, with one chamber	1,525	250,000
Church, States of the, or Papal States	Absolute and elective sovereignty	17,048	2,590,000
Cracow	Republic; senate and chamber of representatives	490	124,300
Denmark, Continental	Absolute monarchy, with provincial states having limited powers	21,472	2,040,000
——— Islands		38,290	57,400
France	Limited monarchy; two chambers	202,125	33,600,000
Frankfort (on the Main)	Republic; senate and legislative body	91	56,000
Greece	Absolute monarchy	10,206	810,000 (a)
*Hamburg	Republic; senate and common council	149	153,000
*Hanover	Limited monarchy; two chambers	14,600	1,679,000
*Hesse-Cassel, or Electorate of Hesse	Limited sovereignty; one chamber	4,386	699,000
*Hesse-Darmstadt, or Grand Duchy of Hesse	Do. two chambers	3,198	765,000
*Hesse-Homburg	Landgraviate; absolute sovereignty	154	24,000
*Hohenzollern-Hechingen	Principality; limited sovereignty, with one chamber	136	21,000
*——— Sigmaringen	Do. do.	383	42,800
Holland (including Duchy of Luxemburg)	Limited monarchy, with two chambers	13,890	2,820,000

(a) The area is assumed from the President's decree of the 25th of April, 1828. Balbi and others carry it above 15,000. The population, according to Klade's Almanac for 1837, is 926,000, besides 12,326 troops.

States.	Form of Government.	Area. Sq. miles.	Population.
Ionian Islands	Free state; with council and one chamber, under British protection	998	242,000
*Liechtenstein	Principality; limited with one chamber	52	5,800
*Lippe-Detmold	Do. do.	452	79,000
*Lübeck	Republic; senate and common council	142	46,500
Lucca	Duchy; limited sovereignty, with a senate	410	145,000
Marino, San	Republic; with senate and council of antients	21	7,500
*Mecklenburg-Schwerin	Grand duchy; limited sovereignty, with one chamber	4,701	472,200
*——— Strelitz	Do. do.	1,094	85,300
Modena and Massa	Duchy; absolute sovereignty	2,078	390,000
Monaco	Principality; absolute sovereignty	50	6,700
*Nassau	Duchy; limited sovereignty, with two chambers	1,736	372,760
*Oldenburg	Grand duchy; absolute sovereignty	2,470	260,000
Parma	Duchy; absolute	2,184	440,000
Portugal	Limited monarchy; with chamber of representatives	34,500	3,400,000
*Prussia	Absolute monarchy, with provincial states having limited powers	106,302	13,800,000
*Reuss, Principalities of	Limited sovereignty, with one chamber	588	83,400
Russia, Empire of—Russian Dominions	Absolute monarchy	1,994,139	47,000,000 (a)
Kingdom of Poland	Do.	47,670	4,100,000
Sardinia	Do.	28,830	4,500,000
*Saxony	Limited monarchy, with two chambers	5,705	1,680,000
*Saxe-Altenburg	Do. with one chamber	491	118,700
*Saxe-Coburg and Gotha	Do. do.	790	132,000
*Saxe-Meiningen-Hildburghausen	Do. do.	880	146,400
*Saxe-Weimar-Eisenach	Do. do.	1,403	243,000
*Schwarzburg, Principalities of	Do. do.	756	118,560
*Schauenburg-Lippe	Do. do.	205	26,000
Sicilies, The Two	Limited monarchy, with a council (consulta)	41,521	7,650,000
Spain	Do. with legislature	179,480	11,968,000 (b)
Sweden and Norway	Do. with diet and storthing	284,580	4,150,000
Switzerland	Confederation of republics, with diet	17,208	2,116,000
Turkey, Empire of (including Wallachia, Moldavia, and Servia)	Absolute monarchy	183,140	12,000,000
Tuscany	Grand duchy; absolute sovereignty	8,302	1,330,000
*Waldeck	Principality; limited sovereignty, with one chamber	455	56,000
*Würtemberg	Limited monarchy, with two chambers	7,568	1,610,000
		3,708,871	233,884,800

Zoology of Europe.—In giving a general view of the animals of Europe, it will be found that the number of wild quadrupeds at present existing (many species having become extinct from the progress of civilization), is too small to exhibit many characteristic peculiarities in their geographical distribution and local adaptation; and the close connexion of this continent with that of Asia makes it very difficult to draw any exact line between their productions. Many of the animals of the south of Europe are also common to the north of Africa; and most of the quadrupeds inhabiting the northern parts of our continent are found in the corresponding latitudes of Asia and America. But though the zoology of Europe does not possess much interest from the number, size, or peculiarity of its animals, this is in some measure compensated by the intimate acquaintance which we possess with the habits and manners of many of the smaller species, whose natural history has been carefully investigated by many able and industrious naturalists.

In the following table the mammalia which are found in Europe are arranged according to their position in the orders of the Cuvierian system; those which are peculiar to this continent, and those which are common both to it and other parts of the globe, are placed in separate columns.

ORDERS.	Whole No. of known species.	Whole No. of European species.	No. of species peculiar to Europe.	No. of species common to Europe and other Continents.
I. Quadrumana	186	1	0	1
II. Cheiroptera	192	27	18	9
III. Carnivora	320	50	17	33
IV. Marsupialia	67	0	0	0
V. Rodentia	295	35	12	23
VI. Edentata	23	0	0	0
VII. Pachydermata	30	1	0	1
VIII. Ruminantia	157	8	1	7
IX. Cetacea	76	28	10	18
Total	1343	150	58	92

We here see the relative number of European mammals placed according to their organization, in different groups or orders; and we may remark that no animal is found in Europe belonging to the Marsupialia and Edentata, while of the Quadrumana and Pachydermata two species only inhabit our continent, one belonging to each order, the Barbary ape (Inuus sylvanus) and the wild boar (Sus scrofa). The former is found among the precipices of the rock of Gibraltar, and thus enters into the geographical limits of Europe.

The domesticated quadrupeds occupy a much more important station among the animals of our continent than any of the wild species: under this head we shall mention the horse, ass, goat, sheep, ox, hog, dog, and cat, and in the more northern parts of Europe the rein-deer may be added.

No wild races of horses at present exist which have not descended from domesticated varieties; but it seems probable that they were aboriginal in Tartary, and most likely in other parts of Asia. From the former country it is conjectured that they were originally imported into the north and east of Europe; while in the southern and western parts of the continent they were probably derived from Barbary and Arabia; but this of course must be mere conjecture, as we cannot name any time within historical limits when these animals were not spread over all or the greater part of Europe. The horses of Spain were celebrated in the time of the Romans, after which they were probably crossed with the Barbary and Arab breeds during the Moorish dynasty. They may be considered as the lightest and fleetest of the old European breeds, and the nearest approaching to the Arab; but they have fallen off greatly during the last century, little care having been bestowed in keeping up the more noble breed. The best Spanish horses are generally about four feet six or eight inches high, and closely resemble the beautiful Arabians of Barbary called Barbs: those of Andalusia, Granada, and Estremadura are the best. The heaviest horses in Europe come from the shores of the North Sea, and the smallest from the north of Sweden and from Corsica. Those of Germany and Italy are of little note. Switzerland produces good draught horses, and those of Holland are noted for the same qualities. The French is a useful and hardy race, and will endure greater fatigue, though it is not possessed of the size and beauty which now characterize the English horses: the native breeds have been much improved lately by crossing with English stallions. Greater attention is paid to the breeding of horses in England than in any other country except Arabia; but while the Arabs only endeavour to preserve their breed in its original purity, we have improved upon it by crossing with other varieties, till the English horses both exceed the Arabian in size and fleetness, and equal them in many instances in symmetry, though they are not quite their match in powers of endurance. The English horses have been divided into four principal classes—the racer, the hunter, the carriage-horse, and the dray-horse.

The ass in Europe holds a very inferior place to the horse.

(a) Including the governments of Perm, Viatka, Kasan, Simbirsk, [illegible], [illegible], Astrachan, and part of Orenburg, 158,390 square miles.
(b) According to the Appendix to a decree in the 'Madrid Gazette' of August, [illegible].

It is generally an ill-used and neglected animal. Originally of Asiatic extraction, it does not accommodate itself so well to our climate as the horse; for it feels the effects of cold more, and degenerates in northern countries; a circumstance which partly accounts for the contempt in which it is held. In the southern parts of Europe it is a fine spirited animal, and approaches in appearance and usefulness to those of Western Asia and Egypt. The Spanish and Maltese are the finest breeds of asses in Europe. One principal use of this animal is for the breeding of mules, which are extensively used in the mountainous parts of Southern Europe as beasts of burden, where, from their possessing the sureness of foot of the ass, with greater size and strength, they are found exceedingly useful.

Sheep and goats, though placed in distinct genera, are so nearly allied, that the characters which distinguish them are very slight; and there are several races or species of wild sheep and goats very nearly approximated.

It is not easy to trace the present domesticated varieties of either of them to any species still existing in a wild state, for both goats and sheep were among the earliest animals domesticated by man. Cuvier imagined that all the present varieties of the domestic goat have arisen from the Capra ægragos, a wild species inhabiting the mountains of Persia, where it is called Paseng by the natives. He also states that this animal has been found on the Alps; but it has been supposed that this variety, which is met with there in a wild state, might have been a hybrid between the common goat and the Ibex. It seems probable that the goat preceded the sheep in domestication; at any rate it did so in the north and west of Europe for many ages. It is a hardier animal, and will live on the roughest fare, being an inhabitant of mountainous districts, where it is principally bred. The most numerous and finest varieties of domestic goats are in Asia. The Welsh breed is large, with fine long hair, generally white. In Sweden and Spain there are long-haired hornless breeds, with upright ears. The utility of goat's milk is well known; and though the flesh of the adult animal is not much valued, that of the kid is very palatable; the horns and hair are used in different manufactures; and the skin is formed into leather for making gloves, &c.

Sheep seem to have been originally derived from western Asia, whence they were imported into Africa, where they arrived at greater perfection than in their parent country. All the wild varieties of sheep have hair, and not wool: the change in the covering of the body seems to have arisen from the effects of cultivation and climate. The different kinds of domestic sheep are all supposed to have arisen either from the Argali (Ovis ammon), or the different varieties of Musmon (O. musmon), one of which is still found wild in some of the islands of Europe, as Candia, Sardinia, and Corsica. There seems formerly to have been a wild race of sheep in Great Britain, which was very large, with great horns and tail. Mr. Pennant observes (*History of Quadrupeds*) that such an animal is figured on a bas-relief taken from the wall of Antoninus, near Glasgow. Boethius says that a breed of sheep lived in St. Kilda which had horns as large as an ox, and reaching to the ground. The principal European breeds of domestic sheep are—1, the many-horned of Iceland; 2, the Cretan; 3, Wallachian; 4, Merino, or Spanish: 5, the English, of which there are many varieties. The most important among the continental races is the Merino, which differs from the English in bearing wool on the forehead and cheeks. The wool is of the finest quality for manufacturing cloth. This breed is extended over the greater part of Spain. But Great Britain possesses the most valuable race of sheep, taking every thing into consideration; for it produces the greatest quantity of the best wool, and the most delicate flesh.

The ox, which belongs to the largest tribe of ruminating animals, is eminently serviceable to man, though since the horse has come into such general use, oxen have been less employed in husbandry. It was first domesticated by the Caucasian nations of western Asia, and from thence is supposed to have found its way into Africa and Europe; but it has been imagined that the domestic varieties in our continent might have arisen from races which once existed in Europe, and even in Britain, in a wild state, the only remains of which is the wild bull of Scotland (Bos Scoticus), still preserved in one or two parks in the North. This is most probably the species which was named Urus by Cæsar, and other antient writers; but what makes it improbable that this was the parent of our domestic oxen is the fact, that several important anatomical differences, principally as to the shape of the skull, are discovered between the Scotch bull and the domestic ox. Numerous specimens of fossil skulls, found in the more recent formations, which are supposed to have belonged to the antient Urus, present also the same differences. The largest European breeds of cattle are those of Podolia, and the Ukraine, of Turkey, Hungary, and the Roman states. The Roman variety is supposed to have been introduced by the Goths, as all the representations of oxen found among old sculptures seem to denote a smaller race, more resembling that which is now seen in Tuscany, of a fine form, and pure white colour. There is a large breed of oxen in Denmark, which is the origin of the Dutch and Holstein varieties; the latter is the parent of the English unimproved breeds.

The hog occupies a low place in the scale of domestic animals, though its flesh forms an exceedingly good article of diet, and one much used by the peasantry in Christian countries. One of its most valuable qualities is that of preserving exceedingly well with salt, without becoming dry and hard, and losing its nutritive properties. The common wild boar (Sus scrofa) of Europe is no doubt the original parent of our domestic varieties. It was once indigenous over the whole of the old world, though now exterminated from some countries, as for instance Great Britain. The English breed of pigs is the finest in Europe, and some of them are fattened to an enormous size. In Ireland every cottager keeps his pig as a regular part of his establishment; and the salting of pork for exportation is a considerable article of trade in that country. There is a peculiar long-legged race of swine in Portugal and Spain. The pigs of Poland and Russia are of a reddish colour, and very small.

The dog claims our attention, not for his use as a beast of burthen, or in providing food for our tables, but for the attachment which he shows to man, becoming his companion and friend, assisting him in his pleasures, and protecting his property and home.

M. F. Cuvier has divided the different varieties of dogs into three primary types; the first has the jaws and muzzle elongated, and we may remark that all the wild species, as the Dingo of New Holland, &c., belong to this group, and more resemble the wolf and fox: this therefore may be considered as the most natural type. The second group has the jaws shorter than in the first, though longer than in the last division. The principal varieties of dog found in Europe belonging to the first group are—1, the *Albanian*, mentioned by the oldest historians and poets; 2, the *French matin*, which is considered by the writers of that nation as the most important of the canine race, and the ancestor of many others; 3, the *Irish Greyhound*; 4, the *great Danish Dog*; 5, the *common Greyhound*. The second group of dogs includes the most intelligent and useful kinds, as the spaniels, hounds, shepherd's, and wolf dogs; and we may here mention as belonging to this section the Alpine spaniel, or Mount St. Bernard dog, a variety of the Spanish breed, which is a beautiful and intelligent animal, kept by the monks at the monastery, from whence it derives its name, for the preservation of unfortunate travellers, who are often lost in the snows of this inhospitable region. Two of them are said to be sent out together, one carrying a cloak, and the other a basket of provisions and cordials: thus provided, they often discover, and are the means of saving persons who would otherwise perish with cold and fatigue. In the last group, which have the muzzle very short, are placed the *mastiff*, *bull-dog*, *pug*, &c. Our English breeds of mastiffs were once so celebrated that the Roman emperors appointed an officer in the island, whose business it was to send these dogs to Rome to fight in the arena; and in later times, when in our own country savage conflicts between dogs and wild beasts were a fashionable amusement, great care was bestowed on the breeding of bull-dogs and mastiffs.

There has been considerable diversity of opinion respecting the origin of the domestic cat, and the part of the world from whence it originally came. It has been thought by some that it must have been an inhabitant of warm climates, as it is a chilly animal, and always creeps as near to the fire as possible. Cuvier believed that it was a native of our European forests, and was the same species as the wild cat at present found, having been only altered by the effects of domestication. In support of this opinion, it is

asserted that cats in some places, near woods or forests, will stray away and return to a savage state, when they assume very much the characters and appearance of the wild cat. According to Bewick (*History of Quadrupeds*), wild cats are found with little variety in most climates. The domestic cat is very useful in destroying vermin, as rats and mice, and is a favourite pet, though it is not capable of much attachment.

The reindeer, which is naturally wild in the north of Europe, becomes, when tamed by the Laplander, of the greatest value to him. It serves him for food, clothing, and as a beast of burthen; by its organization it is formed for crossing the snowy wastes, which without this animal would be impassable: it will draw a great weight when attached to a sledge, and go with amazing swiftness. The riches of a Laplander are estimated by the number of reindeer which he possesses: during the winter season when the ground is covered with snow, and the ox and horse would starve, the reindeer finds plenty of food in a peculiar lichen (*Cladonia rangiferina*), which grows in the greatest abundance, and often covers the soil in steril places for miles, affording nourishment for vast herds of reindeer, which root for this vegetable under the snow like swine in a pasture. Attempts have been made to domesticate this animal in England, but hitherto they have not succeeded. The reindeer is not adapted to our climate, and does not seem likely to be of much use in any point of view even if the experiment should succeed.

The whole number of wild European mammalia at present met with is only 150, which includes 28 belonging to the whale tribe, and 8 species of phocidæ or seals, among which the morse or walrus (*Trichecus rosmarus*) is placed: these being deducted, the number of land animals is reduced to 114, a proportion very small when compared with the three other great continents: of these seventy are also found out of Europe, most of them being common to Asia; there only remain therefore forty-four quadrupeds which are now peculiar to Europe.

We have already mentioned the only quadrumanous animal found within our limits, the Barbary ape, or magot, which, though now naturalized, is probably not an aboriginal inhabitant of Gibraltar.

Of the *Cheiroptera* twenty-seven species are found in Europe, most of which belong to the genus Vespertilio, a small and harmless race of bats. The most common and best known species is the *V. murinus*, the flitter-mouse of the English, which lives in caves, ruined buildings, church towers, the roofs of houses or churches, and hollow trees, where it hybernates during the whole winter, snugly wrapped up in the wing-membranes, and suspended by the hind feet. There are two or three or perhaps more European species of the genus Rhinolphus, commonly called horseshoe bats, and one species of Plecotus has been described as found in Europe. As many as sixteen bats have been enumerated by Jenyns as inhabitants of Britain.

Most of the *Carnivora* of Europe are very insignificant animals by the side of their congeners of Asia and Africa. The only formidable beasts of prey now found within the limits of our continent are the bear, the wolf, and the lynx; but it seems probable that the lion was once met with in the south of Europe. Herodotus says that it was found in Greece between the rivers Nestus and Achelous (vii. 125); and he mentions the circumstance of the army of Xerxes being annoyed by lions on its march from Acanthus to Therme [ATHOS]. The fact of these animals having inhabited our continent is also confirmed by Aristotle, Pliny (unless he is merely copying other writers), and Pausanias. Of the genus Bear there are two species in Europe, the common brown bear (*Ursus arctos*), and the polar bear (*U. maritimus*): the former was once general over the whole continent, and is now found widely diffused in the most solitary districts from the arctic circle to the summit of the Alps and Pyrenees. It is a lonely animal, hybernating during the winter in the hollow of a tree or a cavern, where it remains till the spring without taking any sustenance. It is supposed to be nourished during that time by the fat which accumulates beneath the skin in great quantities in the summer. Cuvier describes a black bear peculiar to our continent, differing from that of America: however, as he never saw but one living specimen, and did not know its habitat, it was probably only a variety of the former species. The polar bear is almost confined to the frozen regions surrounding the north pole, but a solitary individual is occasionally drifted as far south as Iceland, or even the northern extremity of Norway and Lapland. The wolf and fox, the latter under different varieties or species, appear generally distributed over Europe: the former is even now not uncommon among the wooded and mountainous districts of France: when pressed by hunger, it will descend to the farms, and even attack the inhabitants. The lynx, once common in central Europe, has for some time been extirpated, except from some parts of Spain, the Apennines, and the northern parts of the continent: it is about twice the size of the wild cat, which is still said to be a native of Britain. The common glutton or wolverine (*Gulo arcticus*) is a native of Denmark. It is one of those animals whose history is obscured by fable: it feeds principally on dead carcases, though it will kill prey of the smaller kinds, as mice, marmots, &c.; but the stories of its falling from the boughs of trees on to the backs of deer and other large animals, and maintaining its hold there till they drop with fatigue and loss of blood, are doubtless entirely fabulous, as it is a most cowardly animal, and may be easily killed with a stick.

Of small carnivorous quadrupeds there are several species; as many as eight Mustelidæ, or weasels, inhabit different parts of Europe, which are particularly destructive to birds.

Few of the *Rodentia* of Europe require particular notice. The beaver was formerly recorded as a British animal; at present it is found in the neighbourhood of the Rhone, the Danube, the Rhine, and other large rivers on the continent. The porcupine (*Hystrix cristata*) is said to be occasionally met with in Italy, and other parts of the south of Europe. The flying squirrel (*Pteromys volans*) is an inhabitant of Denmark and Lapland, as well as one or two species of lemming (*Georychus*). The different kinds of rats and mice, of which seventeen species have been described, arranged in different genera, form an important feature in European zoology. One species of Hamster (*Cricetus vulgaris*) is distributed over central and northern Europe; and two marmots (*Arctomys marmotta* and *Bobac*); and the Spermophilus Citillus, or Soulisk of the Germans, occurs in the same region.

The *wild boar*, the only aboriginal pachydermatous animal in Europe, was formerly an inhabitant of the forests of Great Britain, and was one of the noblest and most favourite objects of the chase; it is still found on the continent.

The number of *Ruminants* found wild in Europe is very limited, there being only eight species. Of these five are deer, all of which are also inhabitants of other continents, viz., the elk or moose-deer, the rein-deer, the fallow-deer, the red-deer, and the roebuck, which are severally described in the article DEER. The three remaining animals of this order are the ibex, the chamois, and the musmon. The first (*Capra ibex*) is found, though rarely, in the Alps, still more rarely in the Pyrenees, and it is said in some other mountainous parts of Europe and Asia: it lives only in the most lofty and inaccessible places, and is sought for at the extreme peril of the hunter. The chamois inhabits also the wildest and most precipitous regions in the mountains of Europe, though it scarcely ascends to the same heights as the ibex; it is placed in the same group with the antelopes, though by some naturalists it is considered that it should form an intermediate genus between those animals and the goats. The musmon (*Ovis musmon*), the only ruminating quadruped which appears confined in its range to Europe, we have already mentioned as being the supposed parent of our domestic sheep; it has disappeared from the continent, though there is no reason for believing that it formerly existed on the mountains of Spain.

The *Cetacea* are a tribe of animals of which little is known. Their habitation being in the deepest recesses of the ocean, it is impossible to learn much of their habits and characters; and hardly any species can be said to be peculiar to one continent more than another, for the same whale may be met with on the coast of Europe at one time, and on that of America at another. A great many species frequent the shores of Europe, principally on its northern part, and the Greenland fishery is an important branch of European commerce.

The *birds* of Europe are much more numerous than the mammalia. Above 400 species have been described as regular inhabitants of our continent, and a good many more are occasional visitants; but we must confine our notice to a few of the more remarkable and typical species. In the northern or arctic regions very few birds are met with, and

most of them belong to the wading and swimming orders; to whose nourishment and increase the arctic solitudes are particularly congenial. Almost all these species are found also in the northern parts of Asia and America; and the largest proportion occur in southern latitudes, extending even to the shores of the Mediterranean. One of the most characteristic birds of arctic Europe is the great snowy owl (Strix nyctea), which preys chiefly on the ptarmigans and grouse, which frequent these northern regions in great numbers. Two other formidable rapacious birds frequent the northern countries, particularly Lapland: the Iceland falcon (Falco Islandicus), which rarely wanders to more genial climes, and another gigantic owl (Strix lapponica), which is a peculiar inhabitant of the dreary solitudes of Lapland. As we proceed to warmer latitudes, and vegetation acquires a more decisive character, the number and species of birds subsisting on the produce of the earth and on insects greatly increase. Several woodpeckers are met with in the pine forests of Norway, one of which (the Apternus tridactylus) is remarkable for having only three toes on its feet. Among the noblest and most formidable birds of central and southern Europe may be mentioned the golden and imperial eagles; the former (Aquila chrysaëtos) is an inhabitant of the wildest parts of Scotland and Ireland, and rocky places among the higher mountains on the continent. The latter (A. imperialis) is chiefly found in the southern countries. Four species of vulture are met with on the Alps, two of which are found in the north of Africa and the western part of Asia. The bearded vulture (Gypaëtus barbatus), which is almost peculiar to the Alps, is a noble bird, partaking more of the characters of the true falcons, being very courageous and sanguinary; it is above four feet and a half long, from the tip of the bill to the extremity of the tail, and will attack sheep and goats, and it is said that even the ibex and chamois are sometimes killed by it. The great-eared owl represents in central Europe the snowy species of the arctic regions; it is common in the German and Hungarian forests, and is sometimes, though rarely, met with in England. The Gallinaceous genera are few and widely dispersed. The great bustard (Otis tarda) ranges from the western extremity of central Europe to the confines of Asia. The red grouse (Lagopus Scoticus) is the only bird peculiar to Great Britain. This race of birds seems to occupy an intermediate station between the centre of Europe and the confines of its polar extremity: the largest species is the famous cock of the woods (Tetrao urogallus), once an inhabitant of the Scottish forests. The rocky and uncultivated tracts of Spain and Turkey are inhabited by two species of rock grouse (Pterocles), of a genus different from those belonging to northern latitudes. On the shores of the Mediterranean there is a union of the ornithology of Europe, Africa, and Asia: the pelican, the spoonbill, and the flamingo are there met with, though not now very plentifully. Few of the birds of Europe are remarkable for that brilliancy of plumage which is so splendid a characteristic of the birds of tropical climates, but this is, in many instances, more than compensated by their sweetness of voice. The nightingale, the best songster in the world, is common in England and other European countries, though not confined to our continent; it visits us in the breeding season, along with numbers of other warblers, or small insectiverous birds, which enliven our woods and hedges during the spring and summer. The melody of the blackbird and thrush is too well known to require any eulogy. But Europe is by no means destitute of birds characterized by the beauty of their colours, though they are chiefly confined to its southern boundaries: the wall-creeper with its bright rosy wings is common in Italy; while the golden oriole, the European bee-eater, the hoopoe, and the roller are met with in abundance in the two Sicilies during the spring and autumnal migrations; and a modern author says that 'they may occasionally be seen hanging in the poulterers' shops in Naples and Palermo.'

The *reptiles* of Europe are few, and generally harmless. The common viper is almost the only venomous serpent. Numerous little lizards are common in the houses in the southern parts of the continent, as in Italy; but most of them are not peculiar to Europe, being also found on the opposite shores of the Mediterranean. An excellent edible species of turtle inhabits this sea, which resembles in appearance the logger-head of the West Indies, but is much more palatable when dressed. The most remarkable and curious reptile in Europe is the *Proteus anguinus*, which somewhat resembles a water lizard in shape, or an eel with very imperfect legs: it is found in the lake Zirknitz, in Carniola, and more often at the bottom of the grotto of the Maddalena at Adelsberg. It was conjectured by Sir H. Davy and others not to be a natural inhabitant of the surface of the globe, but to be forced up from a subterranean lake through some crevices in the rocks. It was also doubted whether this was a perfect animal or only the larva of some other, but it has been proved to be furnished with both gills and internal lungs; its eyes are quite rudimentary and situated beneath the skin.

Insects and other annulose animals are very numerous in Europe, but few of them possess sufficient interest to require any notice in this general sketch. The scorpion is frequently found in houses in Sicily, though fortunately unknown with us. The common gnat is one of our most troublesome insects, and in warm shady places, where there is much stagnant fresh water, it will cause almost as much annoyance to some people as the mosquito of hot climates, which it closely resembles. In Sweden and other northern countries, where the summer though very short is proportionably hot, it is said that true mosquitos are more numerous than in the woods of tropical America.

Many of the *fish* which frequent the shores of Europe are very important in an economic point of view. We may particularly mention the herring, the anchovy, and the tunny, whose capture and preparation employ a great number of men, and which are also important articles of diet. Herrings (*Clupea harengus*) arrive in great shoals on the western coasts of Europe towards the end of the summer for the purpose of depositing their spawn, and at that time immense numbers are caught, particularly on the British coasts, where they abound. It was supposed by the older naturalists (and among others even by Cuvier) that the herrings migrated from the Northern Ocean in the spring, and returned there after depositing their spawn; but it is the more recent opinion (which is supported by the authority of Mr. Yarrell) that these fish inhabit the deep waters round our coasts, and only approach the shore for the purpose of spawning, and then retire again to the depths of the ocean, where they remain during the winter and spring. The pilchard (*C. pilchardus*), which belongs to the same genus as the herring, is caught only on the coast of Cornwall, where it makes its appearance in July: it goes away in the autumn, and returns in the beginning of January. The anchovy (*Engraulus encrasicholus*) is principally met with in the Mediterranean, which sea it enters in enormous shoals by the Straits of Gibraltar in the spring for the purpose of breeding, after which it retires again to the depths of the Atlantic. The most productive fishery is off Gorgona, a small island west of Leghorn, where it is carried on during the months of May, June, and July. The anchovies are fished for only during the night, and are attracted round the boats by means of fires kept burning in them. Their principal use is for forming a sauce, which is very generally known, and esteemed as a condiment.

The tunny (*Scomber thynnus*) is also an inhabitant of the Mediterranean. It was a fish well known to the antients, and made a considerable branch of commerce: the time of its arrival in the Mediterranean from the ocean was observed, and stations for taking it established in places which it most frequented. (Strabo, p. 225.) It is in the interior of the Mediterranean that this fishery is now principally carried on, particularly along the shores of Catalonia, in Provence, in Liguria, in Sicily, and in Sardinia. These fishes frequent the coasts of Britain, but not in shoals like the tunny of the Mediterranean.

The salmon (*Salmo salar*), which is one of our most valuable and finest fishes, is found in all the seas on the north of Europe, Asia, and America, but it has never been met with in the Mediterranean. According to Cuvier it comes from the Arctic seas, whence it enters in large shoals the rivers of northern countries in the spring for the purpose of spawning. In temperate climates it is towards the end of winter that the salmon quits the sea: in the more northern regions it enters the rivers when the ice begins to melt on the shores of the ocean. Though the salmon is principally confined to the more northern regions, it has not been clearly ascertained how far south it extends, but probably not much beyond the 45th degree of latitude. It occurs, though not plentifully, in the rivers on the western coast of France.

The pike (*Esox lucius*), which is a palatable and whole-

some fish, is exceedingly destructive and voracious; it has been called the fresh-water shark. It is found in almost all the fresh waters in Europe, though more plentifully in the northern than the southern parts. It sometimes grows to a very large size.

EUROPE, BOTANY OF. This continent in its most southern limits exhibits a strong resemblance to the vegetation of Africa and its adjacent islands. In Sicily, for example, along with the vine, grow, in the more steril situations, the poisonous leafless *Euphorbia Canariensis*, an inhabitant of the Canaries, and its congener *E. balsamifera*. *Euphorbia dendroides*, a fine globular shrub, is also met with in company with the castor-oil plant (*Ricinus Africanus*), and the Solanum sodomæum of Egypt. The Date, the Pisang (*Musa Paradisiaca*), and the Prickly Pear (*Cactus Opuntia*), ripen their fruit abundantly; *Agave Americana*, the American aloe, darts up its gigantic flower-stem from the midst of huge horny leaves; rice is grown; the sugar-cane is cultivated at Avola; the cotton-plant (*Gossypium herbaceum*) yields produce of the finest quality on the banks of the Simeto; while the great Italian reed (*Arundo Donax*) supplies the place of the bamboo, and furnishes the long stakes on which the vine is trained. Many parts of the south of Spain partake of this character. The *Smilax aspera* loads the bushes with its fragrant snow-white clusters, maize and Guinea corn are common articles of cultivation, the Peruvian Cherimoyer ripens its fruit in the gardens of Grenada, and the delicate melons of Valencia are as common an open crop as in the fields of Persia. At Barcelona, in the neglected botanic garden, were still found, a few years since, the Sappan tree of Brazil (*Coralpinia Sappan*), the *Schinus Molle* of Peru, and other trees from similar climates flourishing as if in their native air. In Portugal the laurel (*Cerasus Lusitanica*) seems almost identical with the Hixa of the Canaries, while the Coral trees at Lisbon unfold their noble leaves and gorgeous blossoms with all their native South American vigour. In Italy arborescent Endogens extend as far as Nice in the form of the dwarf Palmetto; and the Victor's laurel (*Laurus nobilis*), a common evergreen, is a European representation of the laurels of the Canaries. Along all these latitudes the fig, the olive, the orange, the vine, and the maize find a climate congenial to their southern constitutions. Even in valleys the olive will not exist higher than 44½° N., nor the vine produce good wine beyond 48°, except in a few sheltered places.

About the northern limits of the olive, that is to say, in the parallel of the south of France, a marked change occurs in vegetation; most of the southern equinoctial forms of vegetation either disappear or become uncommon. The Quercus Cerris, so common in Italy and Turkey, is hardly found; evergreen oaks (*Quercus Ilex*), common oaks (*Q. pedunculata* and *sessiliflora*) supply its place. Cluster pines and Scotch firs (*Pinus pinaster* and *sylvestris*) and other species, especially Pinus halepensis, grew along the sea-coast and occupy the position held by the more southern stone-pine (*Pinus pinea*); while *Juniperus Phœnicea* and *oxycedrus*, on the branches of which its peculiar mistletoe is sometimes met with, sweet chestnuts (*Castanea vesca*), the narrow-leaved ash (*Fraxinus oxyphylla*), the flowering ash (*Ornus Europæa*), mastich-trees, and Phillyreas increase the catalogue of trees, no vestige of which is to be traced much higher in a wild state. Still more to the north, where the vine begins to languish, its place is better occupied by broad plains of wheat and other corn; the hardy trees of England, elms, limes, oaks, ashes, alders, beeches, birches, willows, and poplars are found everywhere, with rich pastures and verdant fields, unknown in the land of oranges and myrtles. At last, in the more northern districts of the continent, aspens (*Populus tremula*), bird-cherries (*Prunus Padus*), birches, lime-trees, alders, junipers, spruce-firs, and pines are the principal trees that remain; barley and oats are the only corn-plants, but potatoes continue to be reared in the short cold summer.

Among plants less conspicuous than these and less popularly known, changes occur between the north and south of Europe not less striking to the eye of a botanist. In Sicily occurs a *Stapelia*, a form of vegetation so African, that Arabia Felix and Abyssinia are the nearest points where a parallel can be found. Mandrakes (*Mandragora autumnalis*) cover whole tracts in Turkey and Sicily in the autumn with their sky-blue flowers. Quantities of labiate plants, Boraginaceæ and gay Liliaceæ, Medicagos in abundant variety, an endless host of Cistus and Helianthemum, Narcissi, Tulips, many species of Ophrys, and numerous kinds of Genista and Cytisus mark a zone of vegetation corresponding very much with the distribution of the olive. To the north of this limit such plants either disappear or diminish essentially in number and variety; Apiaceous and Brassicaceous species become predominant, fungi swarm in the autumn, turnips and buckwheat (*Polygonum fagopyrum*) are cultivated advantageously, as also are hemp, flax, hops, carrots, parsnips, common clover, beans, vetches, and lucerne, as common field-crops. But in higher latitudes the predominant forms of herbaceous vegetation are numerous species of Ranunculus, Potentilla, Saxifraga, Arenaria, Primula, Mosses, and Lichens; and there also occur abundance of stunted or pigmy trailing shrubs, such as bilberries and whortleberries (*Vaccinium Myrtillus* and *uliginosum*), *Salix herbacea*, *Arbutus Alpina*, *Arctostaphylos Uva Ursi*, crowberries (*Empetrum nigrum*), and the like.

These changes take place if we merely look to the districts of the plains. In Europe, as in other parts of the world, similar alterations in vegetation occur as we ascend into the atmosphere. In Sicily for instance, with an almost tropical vegetation in the valleys, there is a transition to the middle forms of European vegetation midway on the mountain side, and then to the most northern flora at its summit, 9000 feet above the sea [ÆTNA]; and so with other mountains as we advance to the south, till at last on Sulitelma, in Lapland, not a trace of vegetation can be discovered above the height of 3640 feet.

EURY'ALE. [STELLERIDEANS; MEDUSA.]

EURY'BIA. [MEDUSA.]

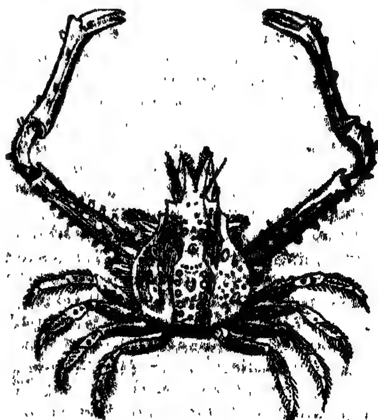
EURY'DICE (Zoology). [ISOPODA.]

EURYLAIMUS. [MUSCICAPIDÆ.]

EURY'MEDON. [ANATOLIA, vol. i., p. 494.]

EURY'NOME, a genus of brachyurous crustaceans established by Dr. Leach, and forming the second genus of the *Parthenopians* of M. Milne Edwards, who remarks that it establishes the passage between *Parthenope* or *Lambrus* and the other *Oxyrhynchi*. The general form of the body and aspect approximates these crustaceans to *Parthenope*, whilst the disposition of their external antennæ is similar to the conformation in *Maia*. The *carapace* is nearly in the form of a triangle with a rounded base, and is strongly tuberculated and covered with asperities. The *rostrum* is horizontal, and divided into two triangular horns. The *eyes* are small; the *orbits* deep, their upper border very much projecting and separated from the external angle by a slit. The internal *antennæ* are bent back longitudinally, and the first joint of the external antennæ terminates at the internal angle of the orbit. The *epistome* is nearly squared, and the third joint of the *external jaw feet* strongly dilated externally. The *sternal plastron* is nearly oval, and its median suture occupies the two last thoracic rings. The *feet* of the first pair are scarcely longer than the succeeding ones; in the male they are rather long, whilst in the female they are very short, but less than those of the second pair; the succeeding feet diminish progressively in length. *Abdomen* consisting of seven articulations in both sexes.

Example, *Eurynome aspera*. Length about half an inch; colour lively red with bluish tints. Locality, the coasts of Noirmoutier and the Channel (La Manche), at rather considerable depths. (Leach; Milne Edwards.) [PARTHENOPE.]



Eurynome Aspera.

EURYPO'DIUS. [LEPTOPODIIDÆ; MACROPODIANS.]

EURYSTO'MIDÆ. [ROLLERS.]

EUSE'BIUS PA'MPHILI, bishop of Cæsarea, in Palestine, the friend of Constantine, and one of the most distinguished among the earlier Christian writers, was born in Palestine towards the end of the reign of Gallienus, about A.D. 264. He passed the earlier part of his life at Antioch, and acquired a great reputation for learning: it was said of him 'that he knew all that had been written before him.' He became intimate with Pamphilus, bishop of Cæsareá, who suffered martyrdom under Galerius in the year 309, and in memory of whose friendship he added to his name that of Pamphili. In 313 he was himself raised to the see of Cæsarea, which he filled until his death. He attended the great council of Nicæa, A.D. 325, where he joined his brethren in condemning the tenets of Arius; but he is said to have raised some objections to the word 'consubstantial with the Father' as applied to the son, in the Nicæan creed. His intimacy with his namesake Eusebius, bishop of Nicomedia, who openly espoused the cause of Arius, led him also to favour the same, and to use his influence with the emperor for the purpose of reinstating Arius in his church, in defiance of the opposition of Athanasius. [ARIUS; ATHANASIUS.] The party to which he attached himself were called Eusebians, from their leader Eusebius of Nicomedia; and they seem to have acted in great measure from hostility against Athanasius and his supporters, as they did not as yet openly advocate the objectionable tenets of Arius, who had himself apparently submitted to the decrees of the council of Nicæa. In 331 Eusebius attended a council at Antioch, consisting of prelates of this party, who deposed, on some insidious charge, the bishop Eustathius, a zealous supporter of the Nicæan doctrine, and offered the see of Antioch to Eusebius of Cæsarea, which he declined. At the council of Tyre, A.D. 335, Eusebius joined in condemning and deposing Athanasius on the charges of disobedience to the emperor in not reinstating Arius, want of respect to the council, and an alleged desecration of some sacred vessels. Eusebius was deputed by the council to defend before Constantine the judgment which they had passed against Athanasius; and he appears to have used his influence with the emperor to have Athanasius banished. The part which he took in this unfortunate controversy caused him to be stigmatized as an Arian, though it appears that he fully admitted the divinity of Christ; and all that his accusers can prove is, that he believed that there was a certain subordination among the persons of the Trinity. (Mosheim, *Ecclesiastical History*; and Schoell, *History of Greek Literature*, and the notes and references therein.) Eusebius of Nicomedia afterwards openly advocated the Arian doctrine under the reign of Constantius, especially at the council of Antioch, A.D. 341. Eusebius of Cæsarea died A.D. 340.

Eusebius was possessed of most extensive erudition, sacred as well as profane, and he was one of the warmest defenders and expounders of Christianity. His principal works are—1. 'The Ecclesiastical History,' in ten books, from the advent of our Saviour to the defeat of Licinius by Constantine, A.D. 324. Eusebius has been styled the father of ecclesiastical history. He is silent on the subject of the Arian controversy, although it had begun at the time when he ends his narrative. Upon the whole, his history is written with considerable discrimination and impartiality. 2. 'De Præparatione Evangelicâ,' in fifteen books. In this work he examines the various systems of theosophy and cosmogony of the antient philosophers, the purest part of which, he maintains, was borrowed from the Jewish sacred writings. Among the writers whom he quotes, and whose works are now lost, are the Phœnician Sanchoniatho and the Egyptian Manetho. From the aberrations of the heathens and the speculations of the philosophers he draws arguments in favour of the truth of the Christian doctrines. This work of Eusebius was followed by another—3. 'De Demonstratione Evangelicâ,' in twenty books, of which only ten have come down to us. It consists of further proofs of the truth of the Christian faith, chiefly directed against the Jews, being drawn from the books of the Old Testament. 4. The 'Chronicle, or Universal History,' was only known by fragments until it was lately discovered entire in an Armenian MS. version, found at Constantinople, and published by Zohrab and Mai at Milan in 1818. The work is divided into two books; the first, entitled 'Chronographia,' contains brief separate sketches of the history of the various nations and states of the old world, from the Creation till the year 325 of our æra. The author gives extracts from Berosus, Alexander Polyhistor, Abydenus, Cephalion, Manetho, and other lost writers. The second book consists of synchronical tables, with the names of the contemporary rulers of the various nations and the principal occurrences in the history of each, from the age of Abraham till the time of Eusebius. The author has made use of the works of Africanus, Josephus, and others. The discovery of the Armenian copy of Eusebius has been a valuable acquisition, as it serves to correct several errors and to supply many deficiencies in chronology and antient history. The other works of Eusebius are—5. 'Onomasticon Urbium et Locorum Sacræ Scripturæ.' 6. 'The Life of Constantine,' in four books, a piece of panegyrical biography. 7. A Life of his friend Pamphilus, of which only a fragment remains; and other minor works.

EUSTACHIAN TUBE. [EAR.]

EUSTA'CHIUS. Bartolomeo Eustachio, or Eustachius, was one of the distinguished band of Italian professors to whom we owe the restoration of anatomy and much of its advancement in modern times. He was born in the early part of the sixteenth century at San Severino, in the marquisate of Ancona. Having accomplished himself in the classical and Arabic languages, he studied medicine at Rome, and afterwards settled there with a view to practise as a physician, under the patronage of the celebrated cardinal Borromeo. The interest he could thus command and his unusual talents were sufficient to elevate him to the chair of medicine in the Collegio della Sapienza; yet he never obtained any degree of professional success, and after a long struggle with poverty and sickness, died in great indigence about 1574.

It is not surprising that Eustachius should have failed as a practical physician, for the exclusive devotion with which he pursued his favourite study must have left him little time for the cultivation of the lucrative branches of his art; but the complete failure as a teacher, of a man of so much genius and enthusiasm, is remarkable. It may be attributed perhaps to the ascendancy of the rival school of Padua, supported by the wealth of Venice, and illustrated by the established fame of Vesalius and his successors; and may be due in part to a defective temper, of which some indications may be observed in his writings, and to the jealousy with which he concealed his discoveries. Eustachius published little in his lifetime, though he lived long and laboured much; yet his treatises, short and few as they are, and composed when anatomy was yet an infant science, are of high authority even at the present day, and bear witness to the accuracy and extent of his researches. They are all in Latin, and are nearly all collected in his 'Opuscula Anatomica,' published in 4to. at Venice in 1564, by himself, and again by Boerhaave, Leyden, 1707, in 8vo. He also published an edition, with annotations, of Erotian's 'Lexicon Hippocraticum.' His principal work, 'On the Disputed Points of Anatomy,' upon which he evidently intended to rest his fame, was unpublished to the time of his death, although announced in the 'Opuscula,' probably for want of means; it was then lost, and has never been recovered; but thirty-nine copper-plates, engraved as early as 1552, and intended to illustrate the text of this work, were found at Urbino in 1712, and given to the world two years afterwards by Lancisi, with the aid of Morgagni, Pacchioni, and other anatomists of distinction. Several editions of them have since appeared with voluminous commentaries; the best is that of Albinus, published at Leyden in 1744, in folio, and reprinted in 1762. The importance attached to these plates, after so long an interval of oblivion, shows how much Eustachius must have preceded his age; and they prove that many facts of great importance in anatomy were accurately known to him, the partial re-discovery of which had shed lustre on a century and a half of subsequent inquiry.

Haller declares it to be impossible without writing a treatise on the subject to particularize the discoveries and corrections that Eustachius introduced into anatomy. The tube leading from the ear-drum to the throat, and a certain valvular membrane in the heart which bear his name are among the former.

EUSTA'THIUS, archbishop of Thessalonica in the latter part of the twelfth century, was one of the most learned scholiasts of his age. He wrote a Commentary upon the 'Iliad' and the 'Odyssey,' which is a mine of antient erudition, and contains extracts from the older commentators, such as Apion, Heliodorus, Demo-

sthenes of Thrace, Porphyrius, and others. It was first printed at Rome in the edition of Homer, 4 vols. fol. 1542-48; the latest edition is that of Leipzig, 1827. Eustathius wrote likewise a Commentary on Dionysius Periegetes, or the Geographer, which was published by Robert Estienne, 1547, and often reprinted since. He also wrote a Commentary on Pindar, which is lost. There are letters of Eustathius existing in MSS. in several libraries; but they have never been published. The novel of 'Hysmine and Hysminias,' published at Paris, 1618, has been also attributed to Eustathius, but, as it is now proved, erroneously.

EUSTA'TIUS, or **EUSTATIA, St.**, in 17° 33′ N. lat., and 63° 3′ W. long., one of the Leeward islands in the West Indies, is a small rocky island, about 25 miles in circumference, rising from the sea, in the form of a truncated pyramid, or sugar-loaf, terminating in a plain surrounded with woods, having a hollow in the centre, which is now a vast den for numerous wild beasts, and is perhaps the crater of an extinct volcano. The climate is in general healthy, but the island is frequently visited by those dreadful thunder-storms and hurricanes which have so repeatedly ravaged the West Indies. These hurricanes have usually occurred in August and September. The extraordinary fertility of the soil, aided by the industry of the Dutch, who have cultivated the island to the very summit, have rendered it one of the most flourishing and wealthy of all the Caribbee islands. The principal article of cultivation is tobacco, but they grow likewise sugar, indigo, and cotton. The island has great abundance of hogs, goats, rabbits, and poultry of all kinds, not only for the consumption of the inhabitants themselves, but for the supply of the neighbouring colonies, with which they are said to carry on a profitable contraband trade, the situation of the island being remarkably convenient for that purpose. This may be one ground of the very jealous policy of the Dutch, which is far more strict than that of the other European nations who possess any of the islands. The only landing-place, naturally difficult of access, is further guarded by a fort, and fortified so as to render it impregnable; nor has any thing been neglected to render every part of the island equally so. Strangers therefore being nearly excluded, have little knowledge of the internal affairs of the island and of the riches with which it abounds.

St. Eustatius became the property of the Dutch by the right of first occupancy; the States-General granted it to some merchants at Flushing, and it was first settled about the year 1600. In 1665, when the English were at war with the Dutch, the latter were dispossessed by an armament sent from Jamaica. In the sequel France and Holland having formed an alliance, St. Eustatius was reconquered from the English by a combined force, and the French kept a garrison in the island till the treaty of Breda, when it was restored to the Dutch. Soon after the revolution of 1688, the French expelled the Dutch from St. Eustatius, but were obliged to capitulate to Sir Timothy Thornhill, who granted them only their lives and baggage, and left a small English garrison for the protection of the Dutch, who again recovered the entire possession of the island by the peace of Ryswick. They kept it till 1781, when it was taken by the English, but restored at the peace in 1783. The English again took it in 1801, and gave it back to the Dutch in 1814.

EUSTYLE. [CIVIL ARCHITECTURE.]

EUTO'CIUS, a Greek mathematician of Ascalon, in Palestine, who flourished about A.D. 550. He was pupil of Isidorus, the architect who designed and chiefly built the celebrated church (now the mosque) of St. Sophia at Constantinople; and he became ultimately one of the most distinguished geometricians of his time.

It was the general custom of mathematical and philosophical authors, during the decline of learning, to give their views and their discoveries, where they made any, in the form of commentaries on some earlier writer. Eutocius, like Proclus and others, delivered his views in this way; and like them he furnishes some valuable contributions to the history of mathematical science amongst the Greeks.

The commentaries of Eutocius on the works of Archimedes and Apollonius are the only works by which he is known to modern readers. His commentaries on Apollonius were published in Halley's Oxford edition of the works of that author, 1710; and those on Archimedes in various editions, from that of Basil, 1544, to that of Oxford, 1792.

Of the commentaries of Eutocius, those on the treatise of Archimedes 'On the Sphere and Cylinder' are most valued; and chiefly for his account of the various modes of solving the Delian problem of the Duplication of the Cube. All of them, however, though of less value both as to historical and geometrical matter, are still interesting to every one who takes a pleasure in investigating the history of pure science.

The commentary on the 'Measurement of the Circle,' by Archimedes, was translated into German, together with the text of Archimedes to which it refers, by J. Gutenäcker, Würzburg, 1825 and 1828, 8vo.

EUTRO'PIUS, FLAVIUS, was a Latin historian of the fourth century. Little is known of his life; he was secretary to the Emperors Constantine and Julian, and accompanied the latter in his unfortunate Parthian campaign. He is believed to have been of senatorial rank. He is known as the author of a compendium of Roman history, in ten books, from the foundation of the city down to the accession of Valens, A.D. 365, which, being short and easy, has been much used as a school-book. Meagre as it is—for it might be contained in 100 common-sized octavo pages—it is still of some use towards filling up those gaps in history which are left in consequence of the total loss of some writers and the imperfect condition in which others have come down to us. The best edition is said to be that of Haverkamp, Leyden, 1729, 12mo., improved by Verseik, Leyden, 1762, 2 vols. 8vo.

EUTYCHIANS, a sect of Christians which began in the East in the fifth century. Eutyches, its reputed founder, though the opinions attributed to him are said to have existed before (*de Eutychianismo ante Eutychen*, by Christ. Aug. Selig, and also Assemani, *Bibliotheca Orientalis*, tom. i., p. 219), was a monk who lived near Constantinople, and had a great reputation for austerity and sanctity. He was already advanced in years when he came out of his retirement, A.D. 448, in order to oppose the Nestorians, who were accused of teaching 'that the divine nature was not incarnate in, but only attendant on, Jesus, being superadded to his human nature after the latter was formed;' an opinion however which Nestorius himself had disavowed. In his zeal for opposing the error ascribed to the Nestorians, Eutyches ran into the opposite extreme of saying that in Christ there was 'only one nature, that of the incarnate Word,' his human nature having been absorbed in a manner by his divine nature. Eusebius, bishop of Dorylæum, who had already opposed the Nestorians, denounced Eutyches before a council assembled at Constantinople by Flavianus, bishop of that city. That assembly condemned Eutyches, who, being supported by friends at the court of Theodosius II., appealed to a general council, which was soon after convoked by the emperor at Ephesus, A.D. 449, under the presidency of Dioscorus, bishop of Alexandria, and successor to the famous Cyril, who had himself broached a doctrine very similar to that of Eutyches. The majority of the council tumultuously acquitted Eutyches and condemned Flavianus; the bishops opposed to him were obliged to escape, and Flavianus was cruelly scourged by the soldiers; it was in short a scene of disgraceful violence, which earned for the council of Ephesus the name of 'a meeting of robbers.' Flavianus appealed to Leo the Great, bishop of Rome, who, in his answer, condemned the doctrine of Eutyches, but could not obtain of Theodosius the convocation of another council. After the death of that emperor, his successor, Marcianus, convoked a council at Chalcedon, A.D. 451, which is reckoned as the fourth œcumenical council of the Church, and which the pope's legates attended. By this assembly the acts of the council of Ephesus were annulled, Dioscorus was deposed and banished, and Eutyches, who had already been banished by the emperor, was again condemned, and deprived of his sacerdotal office. The doctrine was at the same time expounded that 'in Christ two distinct natures are united in one person, and that without any change, mixture, or confusion.' Eutyches died in exile; but several monks, especially in Syria, continued the schism, and having found a protectress in the empress Eudocia, the widow of Theodosius, who was living in Palestine, they became more daring, and excited the people against the partizans of the council of Chalcedon, whom they stigmatized as Nestorians. The emperor was obliged to send troops to repress these disorders. The doctrine of Eutyches was perpetuated in the East under certain modifications, or rather quibbling of words, which caused the sect to be subdivided under various names,

all however comprehended under the general name of Monophysites, or believers in one nature. (Assemani, 'de Monophysitis,' at the beginning of vol. ii. of his *Bibliotheca Orientalis*, and Albufarragius's *arguments* in favour of that doctrine in the same vol., pp. 288,9.) In the sixth century a fresh impulse was given to the Eutychian doctrine by one Jacob, a monk, surnamed Baradæus, who reconciled the various divisions of the Monophysites throughout the East, and spread their tenets through Syria, Armenia, Mesopotamia, and Egypt, found supporters among several prelates (among others in the bishop of Alexandria), and died himself bishop of Edessa, A.D. 588. He was considered as the second founder of the Monophysites, who assumed from him the name of Jacobites, under which appellation they still constitute a very numerous church, equally separate from the Greek, the Roman or Latin, and the Nestorian churches. The Armenians and the Copts are Jacobites, and so are likewise many Syrian Christians in contradistinction to the Melchites, who belong to the Greek church. Jacobite congregations are found in Mesopotamia.

The Monothelites who appeared in the seventh century have been considered as an offshoot of the Eutychians or Monophysites, though they pretended to be quite unconnected with them. They admitted the two natures in Christ, explaining that after the union of the two into one person there was in him only one will and one operation. This was an attempt to conciliate the Monophysites with the orthodox church, and it succeeded for a time. It was approved of by many eastern prelates, and even by Pope Honorius I., in two epistles to Sergius, patriarch of Constantinople, which are found in the Acts of the Councils. But the successors of Honorius condemned the Monothelites, and Martin I., in a bull of excommunication, A.D. 649, consigned them and their patrons (meaning the Emperor Constans, who protected them) 'to the devil and his angels.' Constans, indignant at this, caused his exarch in Italy to arrest Martin, and send him prisoner to the Chersonesus. At last, under Constantine, who succeeded Constans, the council of Constantinople, which is the sixth œcumenical council, A.D. 680, condemned the Monothelites, and with them Pope Honorius himself. (Mosheim, *The Acts of the Councils;* and Bossuet, in his *Defence of the Declaration of the Gallican Clergy*, 1682.)

EUXINE. [Black Sea.]

EVA'GORA. [Medusa.]

EVA'GRIUS, born at Epiphania, in Syria, about the year 536, practised as an advocate at Antioch, where he acquired a brilliant reputation. He was afterwards appointed quæstor, and filled other public offices. He wrote an ecclesiastical history in six books, beginning with A.D. 431, about the period where the histories of Socrates and Theodoretus terminate, and continuing to the year 593. His work is spoken of favourably by Photius. Evagrius, though not always to be trusted implicitly, yet shows greater discrimination than Socrates; he consulted the original documents, and appears to have been tolerably impartial. He was well acquainted with profane, as well as ecclesiastical history. His work was published by Robert Estienne, and afterwards by Valois, Paris, 1679, in an improved edition founded upon two different MSS. It was published again with notes at Cambridge, 1720.

EVALD, JOHANNES, the most distinguished poetical genius produced by Denmark in the eighteenth century, was born at Copenhagen, November 18th, 1743. His father, who was a clergyman in that city, possessed considerable theological attainments, but was prevented by ill health from acting as preceptor to his sons. Johannes, therefore, the second and most gifted of the three, was shortly before his father's death (1754) sent to Slesvig, where his tutor left him entirely to his own choice of books for his leisure reading. Among these were translations of 'Robinson Crusoe' and 'Tom Jones,' the former of which so captivated his imagination that he proposed its hero as a practical model to himself, and when no more than 13 years old, eloped with the view of making his way to Holland, and there get on board ship for Batavia; but he was overtaken, and his project frustrated. He was still, however, left as before to inflame his fancy with romantic reading and with legendary lore, including that of saints and martyrs, as well as of northern fable and mythology. In reading the classics it was the adventurous part that chiefly engaged his attention: indeed he had at that time no relish whatever for the beauties of the Roman poets, as he himself has acknowledged in his fragmentary autobiography. Notwithstanding he was of exceedingly weak frame of body, he longed to devote himself to a military career, and the war then carried on between Prussia and Austria afforded an opportunity; but his mother would not consent to his entering the army. Soon after, his thoughts were for a while diverted from such views by a very different object. He suddenly became violently enamoured with a young lady, a relation of his step-father's, for his mother was now married again, whom he has celebrated under the name of Arense, and his passion for whom he has described in the most glowing colours; a passion which, although hastily conceived was lasting in its effects, and which, although the source of heartfelt bitterness to him—since Arense bestowed her hand upon another—while it cast a shade of melancholy over his whole life, had a favourable influence on his poetical talent, producing in him that depth of feeling and pathos which discovers itself in his 'Balders Död' (Death of Balder). At this period, however, poetry, at least authorship, formed no part of his plans. Dissatisfied with being beneath his step-father's roof, he joined with his elder brother in the scheme of entering the Prussian service as hussars. The latter returned after reaching Hamburg, but Johannes proceeded to Magdeburg, where he enlisted, but was received only as a foot-soldier. In consequence of this disappointment he deserted to the Austrians; served in Bohemia; and was at Dresden when that capital was besieged by the Prussians. On his return to Denmark he applied himself to the study of theology, with the view of settling in that profession and marrying, when his hopes of the latter were frustrated, as already noticed. He now regarded with indifference all schemes of earthly felicity; and it was in this frame of mind that he took up his pen and produced his 'Lykken's Temple' (The Temple of Fortune, a vision), which at once stamped his reputation. This was succeeded by his 'Adam and Eve,' a dramatic composition replete with poetical energy, yet in many respects defective and anomalous. Conscious of its imperfections, he devoted two years entirely to the study of poetry and the best models, in order to prepare himself for some more finished undertaking. Having made himself master of the English language, he carefully perused Shakspeare, with whom he was before acquainted only through Wieland's translation. Ossian was likewise a favourite with him, and when he again took up his pen, he composed his 'Rolf Krage,' a tragedy strongly tinctured with Ossianic taste. It was first given to the public in 1770; about which time he was attacked with a most painful disorder in his limbs, that continued to afflict him with little intermission during the rest of his life. Notwithstanding his severe sufferings, he not only pursued his literary occupations, but wrote his comedy of 'Harlequin Patriot,' a masterpiece of its kind, abounding with pleasantry and satire chiefly directed against pseudo-reformers. In the following year, 1773, he executed his literary chef-d'œuvre, 'Balders Död,' a drama of extraordinary poetical beauty, and greatly superior to anything of the kind that had then appeared in the Danish language. Yet although well received, its merits were not so well appreciated by its author's contemporaries as they have been since. Although it is on this and his other poetical works that his reputation chiefly rests, Evald produced several things in prose, some of which—as his 'Forslg om Pebersvende' (Project respecting Old Bachelors), are replete with shrewd satire and strong comic humour, notwithstanding they were written when he had to contend both with ill-health and distressed circumstances. Their liveliness forms a strong contrast to the seriousness and even melancholy that pervade his other writings; in which respect he presents a parallel to the author of 'John Gilpin.' There is likewise another point of resemblance between Evald and Cowper; each in his affliction met with generous sympathy and succour from a female friend. What Mary Unwin was to the one, Madame Skou was to the other; and it was beneath the hospitable roof of the latter that the Danish poet breathed his last, on the 17th March, 1781, after being confined during two years to his bed or arm-chair, and almost deprived of the use of his limbs. The two poets may further be likened to each other for the high moral tone of their writings, vividness of conception, and happiness of expression.

EVANGELIST is the Greek appellation *Euangelistes* (εὐαγγελιστής, from εὖ and ἄγγελος), which signified a messenger of any good news, as in Isaiah xli. 27, of the Sep-

tuagint version. In the first ages of Christianity it was a general name of all those who, either by preaching or writing, announced the 'glad tidings' of the Christian revelation. The learned Hooker, in his 'Ecclesiastical Polity,' b. v. § 78, says that 'Evangelists were presbyters whom the apostles sent forth, and used as agents in ecclesiastical affairs.' They were similar to the class of ministers who in modern times are known as itinerant preachers. The deacon (subordinate minister) Philip is called an evangelist (*Acts* xxi. 8: see Grotius on the passage); so Ananias, Apollos, Timothy, and several others. St. Paul, in his epistle to the Ephesians (iv. 11), places evangelists in the third rank of ecclesiastical officers; thus, apostles, prophets, evangelists, pastors, teachers. The use of the term is now confined to the four writers to whom the canonical gospels are attributed, Matthew, Mark, Luke, and John, and the gospels themselves are not unfrequently, though incorrectly, called the Evangelists. St. Jerome states that the symbols of the four evangelists are a man, a lion, a calf, and an ox; but St. Augustine declares them to be a lion, a man, an ox, and an eagle. (*Ezekiel*, i. 5-10; *Rev.* iv. 7.) Dr. Campbell, in his 'Dissertation on the Gospels' (vol. i. p. 126, &c.), gives a variety of learned and critical remarks on the word εὐαγγελίζειν as the translation of the Hebrew בשר *bashar*, 'læta annunciare,' 'to announce good tidings.' (See the word in Rose's ed. of Parkhurst's *Gk. Lex. of the N. T.*, and a list of works on the Evangelists in Watt's *Bibliotheca Britannica*, and Horne's *Introduction to the Bible.*) General histories of the four Evangelists have been written by Kirstenius, Spanheim, Mollerus, Florinus, Schrœder, &c.

EVAPORATION. [HEAT.]

EVECTION. [LUNAR THEORY.]

EVELYN, JOHN, author of 'Sylva,' 'Memoirs,' &c., was the second son of Richard Evelyn, Esq., of Wotton, in Surrey, and was born at that place October 31, 1620. He received his education at Lewes' free school and Baliol College, Oxford. In 1641 he went abroad, and served for a short time as a volunteer in Flanders. Instead of taking arms in the royalist cause, as his family politics would have inclined him, he went abroad a second time in 1644, with the king's permission, and spent, with one interval, the next seven years on the continent, diligently employed in studying natural philosophy, cultivating his taste in the fine arts, and acquainting himself with such particulars of manners, trade, and manufacture as were most worthy of notice. In June, 1647, he married the daughter of Sir Richard Browne, the royalist ambassador at Paris, and in right of his wife became possessed of Sayes Court, near Deptford, where he fixed his abode on returning to England in 1652. He lived in privacy and study till the Restoration; after which, being much esteemed by the king and of some weight by family, fortune, and character, he was often withdrawn from his retirement and engaged in many capacities in the public service. He was appointed a commissioner to take care of the sick and wounded, on the Dutch war breaking out in 1664, commissioner for the rebuilding St. Paul's, a member of the Board of Trade on its first institution, &c. He was also one of the first members of the Royal Society, and continued through life a diligent contributor to its 'Transactions.' His most favourite pursuits were horticulture and planting, upon which he wrote a variety of treatises, which are collected at the end of the fifth edition (1729) of his 'Sylva, or a Discourse on Forest-trees and the Propagation of Timber in his Majesty's Dominions,' first published in 1664. The object of this, the best known and chief of Evelyn's works, was to encourage planting, both as a matter of national interest and of private adventure. It sold largely, and, as Evelyn himself says, had no small effect. In the same year he published the first 'Gardener's Almanac,' containing directions for the employment of each month. This was dedicated to Cowley, and drew forth one of his best pieces, entitled 'The Garden,' in acknowledgment.

Mr. Evelyn's works on the fine arts are: 'Sculpture,' 1662, a history of the art of engraving, in which the first account is given of Prince Rupert's new method of mezzotinto engraving: 'A Parallel of Antient and Modern Architecture,' 1669: 'Numismata, a Discourse upon Medals,' 1697. All these, though long superseded, were much esteemed, and were in fact valuable additions to the then existing stock of literature.

By the death of his brother, in October, 1699, Mr. Evelyn succeeded to the family estate at Wotton, where he died, February 27, 1706, full of honour as of years. He was a diligent and successful labourer, in that age of discovery, in the subordinate departments of science; a valuable pioneer, as he used to call himself, in the service of the Royal Society. Besides this, he was a model for the character of a gentleman. A friend of the learned and the good, devoid of jealousy, pious, beneficent, intellectual, delighting in the occupations of his station, yet always ready to quit them for the public service: he was respected even by the court profligates to whom his example was a daily reproach. To the present age he is best known by his Memoirs, a journal extending nearly from his childhood to his death, which contains much curious matter relative to his travels, and to the manners and history, political and scientific, of the age. Many of his letters, and the private correspondence of Charles I. with Secretary Nicholas, and Clarendon with Sir R. Browne, are subjoined to these memoirs, which were first printed in 1818. (Kippis, *Biog. Brit.*; *Preface and Appendix to Memoirs.*)

EVERGEM, a town and commune of East Flanders, in the district of Ghent, about three miles north of the city of Ghent, in 51° 8′ N. lat. and 3° 44′ E. long. The canal of Sas-de-Gand, which connects Ghent with the Scheldt, passes Evergem, the little river Caele runs on the south of the town, on the south-west is the Ghent and Bruges canal, and on the west the Liève, which rises in the north-east quarter of West Flanders and joins the Bruges canal near Evergem. The population of the town is 7790; it contains establishments for cotton-printing and dyeing, breweries, distilleries, and a salt-refinery. Cotton and linen weaving give employment to many of the inhabitants. In 1832 the town contained a communal and six private schools: in the former 57 boys and 49 girls were taught, and in the latter 261 boys and 211 girls.

(Vandermaelen's *Dictionnaire Géographique de la Province de la Flandre Orientale.*)

EVERGREENS, in horticulture, are plants which shed their old leaves in the spring or summer after the new foliage has been formed, and which consequently are verdant through all the winter season; of this nature are the holly, the laurel, the ilex, and many others. They form a considerable part of the shrubs commonly cultivated in gardens, and are beautiful at all seasons of the year.

The principal circumstances in which evergreens physiologically differ from other plants are the hardness of their cuticle, the thickness of the parenchyma of their leaves, and the small number of breathing pores formed on the surface of those organs. These peculiarities, taken together, enable them to withstand heat and drought with more success than other plants, but are often not sufficient to protect them against such influences in excess. Hence we find them comparatively uncommon in those parts of the continent o Europe where the summers are hot and dry, and most flourishing in a moist insular climate like our own. This is rendered more intelligible by a comparison of the proportions borne by their evaporating pores, or stomates, and those of deciduous plants. As far as this subject has been investigated, it appears that their leaves are usually altogether destitute of such organs on the upper side, and that those of the lower are mostly fewer in number and much less active than in deciduous plants.

The greater part of evergreens are raised from seed; some are propagated by cuttings or layers, and the variegated varieties by budding and grafting. The soil in which they succeed best differs with the kinds; American evergreens, such as rhododendrons, kalmias, &c., grow best in equal quantities of peat earth, sand, and vegetable mould; European sorts grow in their greatest vigour in a fresh hazelly loam, but will thrive in almost any kind of soil.

The operation of transplanting evergreens may be performed with success at almost all seasons of the year. *Midsummer planting* has even been recommended; it however is a work of necessity rather than propriety, because its success depends entirely upon the nature of the weather after the operation; if it be cloudy and wet for some time they may succeed; but if, on the contrary, it be hot and dry, they are sure to suffer: for this reason, if the practice may be adopted, it is not to be recommended. The common holly however has been often known to succeed when planted at this season, either for hedges or as single plants. The hollies in one very remarkable case, were carefully dug up in the cool of the evening and removed to large trenches

which had been prepared for their reception; a quantity of water was then poured upon the roots, and the soil thrown upon the top of it, which of course was carried down and deposited in all the crevices in the trench, rendering the plants perfectly firm. In the instance alluded to the weather was very favourable for a considerable period after the operation was performed.

Autumn and spring are much better seasons for work of this kind; the plants are not so liable to suffer from the intense heat of the sun, and are more likely to be benefited by dews and frequent rains.

But, according to the most experienced cultivators, the winter months (that is, from October to February) are decidedly the best time for transplanting evergreens. Mr. McNab, who is one of the greatest authorities upon this subject, says—'I have planted evergreens at all seasons of the year with nearly equal success, except from the middle of June to the middle of August, and even during this period I have planted some; but unless the weather is very dull and moist, it is difficult to prevent the plants suffering considerably, and in many cases it is years before they recover. Although, however, I have planted evergreens ten months out of the twelve with little difference of success, yet one season has a preference over the others with me, and when there is the power of choice I would recommend late in autumn, winter, or early in spring; that is, any time from the middle of October till the middle of February; and, in general, the beginning of this period is the best; that is, from the middle of October till the middle of December; always providing that the weather and the ground are favourable; that is, supposing there is no frost, no drying wind, nor much sunshine, and that the ground is not too much saturated with wet, either from continued rain, or from the nature of the soil. One of the principal things to be attended to in planting evergreens is to fix on a dull day for winter planting, and a moist day for spring and autumn planting.'

It is of great importance to keep a number of the more tender sorts of evergreens in pots, in order to send them to a distance if required; and if they are to be transplanted at home their roots are not so liable to be injured as when they are dug from the ground. The more tender species of the following genera should be treated in this way:—Arbutus, Cupressus, Daphne, Erica, Juniperus, Laurus, Magnolia, Phyllirea, Pinus, Quercus, Rhamnus, Thuja, &c.

In lifting evergreens particular care should be taken of the young rootlets, as upon their preservation the success of the operation, in a great measure, depends; especially if the specimens have arrived at any unusual size. Small evergreens are planted like other things; but the following precautions should be observed in all cases where individuals of any great size are the subject of the operation.

When the plant has been lowered into the hole dug for its reception, the soil must be thrown in loosely around it (not trod in), and a basin made to hold a quantity of water, which must be filled several times until the whole is completely saturated; this will convey the particles of soil down to the roots of the plant, and render it much more firm than any other method. By this treatment we have seen plantations of evergreens formed without a single failure, which, when finished, appeared to have been growing for many years.

It matters little what size the plants have attained, if they can only be lifted without injuring the small fibres of the roots: they have been moved, from ten to twenty feet high and otherwise large in proportion, with complete success. Should, however, the roots be unavoidably injured in transplanting, the branches must be closely pruned and shortened in proportion; so that when they begin to draw upon the roots for support they may not require more nourishment than the latter can supply.

Considering the great importance of evergreens in a climate like that of Great Britain, where they flourish in such unrivalled beauty, and form so much natural protection to bleak exposed situations, they cannot be too extensively planted. The following lists will furnish information as to the principal kinds to be procured in the nurseries:—

I. *Evergreens whose beauty depends exclusively upon their foliage.*

TREES.

Abies. All the species, where the soil is light enough to suit them; particularly *A. Douglasii*, *excelsa*, the Norway Spruce, *Deodara*, the Cedar of India, *Cedrus*, the Cedar of Lebanon, and *Larix*, the common Larch, together with *balsamea*, the Balm of Gilead, *picea*, the Silver fir, and *Webbiana*, the Silver fir of the Himalaya mountains. [ABIES.] The Cedar of Lebanon will grow well in a swamp.

Araucaria imbricata, the glory of the mountains south of Chili: it will hardly succeed north of the midland counties.

Cunninghamia lanceolata, the Chinese fir; very handsome, but only suited to the south of England.

Cupressus sempervirens, the common cypress, and *C. horizontalis*, the spreading cypress, are quite hardy: and the latter, if to be procured, forms a tree much more ornamental than the other with its formal shape. But the nurserymen almost always sell a slight variety of *C. sempervirens* for it.

Cupressus lusitanica, the Cedar of Goa, is a beautiful tree, but only suits the climate of southern counties.

Ilex Aquifolium, common Holly: the nurseries contain endless varieties of it, both green and variegated. The latter are not to be compared with the others for beautiful effect.

Juniperus. The *J. excelsa* forms a fine tree; *J. Virginiana*, the common Virginian Cedar, is less handsome: but both are quite hardy. [JUNIPERUS.]

Pinus. All the species where the soil is light and steril enough, with that proportion of decayed unfermented vegetable matter which this genus delights in. The finest, as ornamental plants, are *P. pinaster*, *taurica*, *Pinea*, the stone pine, *nigricans*, *halepensis*, and *Pallasiana*, which will grow in any soil that is not stiff and swampy in winter. *P. sylvestris* and *nigricans* are the hardiest.

Quercus. The *Ilex*, or Evergreen oak, of which there are many varieties; *austriaca*, of which the Lucombe and the Fulham oaks are possibly domesticated forms; *Turneri*, *Suber*, the cork-tree, and *gramuntia*, the *Bellota*. or Spanish oak with sweet acorns, are all fine species equally handsome when young as bushes, and when old as trees. [QUERCUS.]

Taxus baccata, the common Yew, and *fastigiata*, the Irish Yew.

Thuja occidentalis, the American, and *orientalis*, the Chinese Arbor Vitæ.

SHRUBS OR BUSHES.

Aristotelia Maqui, a Chilian broad-leaved shrub, quite hardy.

Abies Clanbrasiliana, a curious dwarf fir, only suited to plant singly upon grass.

Cunninghamia lanceolata, the Chinese fir, rarely grows beyond the size of a bush.

Arbutus Andrachne, the Oriental Strawberry tree, and *hybrida*.

Aucuba Japonica, a Japanese spotted-leaved bush.

Buxus sempervirens, the tree Box; will succeed in light, especially sandy, steril soil; prefers chalky downs; will not thrive in stiff wet soil.

Juniperus communis, the common juniper; *Suecica*, the Swedish juniper, much less handsome; *Sabina*, the Savin bush, excellent for undergrowth and ornamental as a single bush upon lawns.

Laurus nobilis, the sweet bay, quite hardy, though a native of 'the warm south;' its aromatic leaves employed in confectionary, pickles, &c.

Ligustrum vulgare, the common privet; excellent for hedges and for undergrowth, especially the *evergreen* variety.

Phyllirea. Every variety of this valuable genus should be cultivated; *obliqua* and *latifolia* as large species, *media* as a middle-sized one, and *angustifolia* as a graceful bush.

Pinus pumilio or *Mughus*, the alpine pine tree.

Rhamnus alaternus, of which there are several varieties and *R. Clusii*; hardy bushes, which bear pruning cutting down to the ground remarkably well.

TWINERS.

Hedera. Many varieties of the common ivy; *Canariensis* the Irish ivy; and *chrysocarpa*, the golden-berried.

II. *Evergreens whose flowers have a conspicuous appearance*

TREES.

Andromeda arborea requires peat; grows 40 feet high in North America.

Arbutus Unedo, the common strawberry tree; of this there is a beautiful variety with deep red flowers, and another with double flowers, much less handsome than either.

Acacia affinis grows without protection near Edinburgh; *dealbata, lophantha*, and several other New Holland species, will flourish without protection in the southern counties.

Eucalyptus perfoliata, pulverulenta, exist in the open air near Edinburgh; they and other species will thrive in the South and West of England.

Ligustrum lucidum, the wax tree, a Japanese plant.

Magnolia grandiflora, with many varieties; they are scarcely hardy enough to live in this country away from the shelter of a wall, except quite in the south; unprotected specimens exist, however, near Edinburgh.

SHRUBS OR BUSHES.

Andromeda. The handsomest species are *A. Catesbæi, angustifolia, Mariana*, which is rather tender, *pulverulenta, speciosa*, and *floribunda*. Require peat soil.

Arctostaphylos Uva Ursi, a trailing plant.

Ammyrsine Lyoni, a beautiful little American bush, requiring peat.

Berberis aquifolium, fascicularis, repens, Asiatica, aristata. [BERBERIS.]

Bupleurum fruticosum stands the sea-breeze well upon chalky cliffs.

Cistus, all the species. They are quite hardy if planted where wet cannot lodge in winter, and exposed to the full sun in summer.

Colletia spinosa.

Cotoneaster microphylla and *rotundifolia*, small bushes.

Cytisus scoparius, common broom; there is a double variety; *albus*, the Portugal white broom.

Daphne. All handsome, the following the most so: *Laureola*, the spurge laurel, grows well beneath trees; *pontica*, with pale green fragrant flowers; and *Cneorum*, or Garland flower, one of the most lovely and sweetly perfumed plants in the world, but not to be cultivated except in a dry peaty soil and a well ventilated situation; late spring frosts injure it so much that it is not worth cultivating in valleys.

Duvaua dependens, and some others.

Erica Australis, carnea, stricta, Mediterranea, codonodes. [ERICA.]

Escallonia rubra, illinita, montevidensis, handsome South American shrubs. Bees take great delight in the blossoms of the last; the second species smells very strongly of melilot.

Garrya elliptica, with long pendulous catkins of a yellowish green colour.

Genista tinctoria, the dyer's broom, with a few others.

Helianthemum of all kinds, to cover rockwork, or ground where the wet does not lodge in winter.

Kalmia latifolia, angustifolia, especially the first; require peat.

Lavandula spica and *latifolia*, common lavender.

Ledum latifolium, or Labrador tea, and *palustre;* low bushes requiring peat.

Menziesia polifolia or Irish heath; there is a white variety.

Myrtus communis, and its varieties; lives out of doors south of London.

Prunus Laurocerasus, the common laurel; *lusitanica*, the Portugal laurel.

Pittosporum Tobira, quite hardy south of London; sweet-scented.

Rosmarinus officinalis, common rosemary.

Rhododendron. Numerous varieties are to be procured; those of *ponticum, maximum*, and *catawbiense* are the most robust; *hybridum* obtained between the Indian and American species is less hardy; *ferrugineum* and *hirsutum*, dwarf alpine species; *campanulatum*, a North Indian species.

Spartium Junceum, Spanish broom; and *acutifolium*, a Turkish broom.

Viburnum. Of the Laurustinus, one of the prettiest of all evergreens, there are three species; *V. Tinus*, the common Laurustinus, the hardiest; *V. lucidum*, with shining leaves, rather larger and more delicate; *V. strictum*, with upright shoots, more hairy, and the least hardy of the three.

Ulex Europæus, the common furze; a double variety, which is particularly handsome; and *U. strictus*, the Irish furze, a smaller species, which does not flower abundantly.

Yucca. Several species quite hardy. They only require to be grown in places where water does not stagnate in winter; *Y. gloriosa, filamentosa, Draconis, flaccida*, and *superba*, are the handsomest species.

TWINERS OR CLIMBERS.

Bignonia capreolata, with dull brownish-red trumpet-shaped flowers; rather tender.

Caprifolium flexuosum, gratum, japonicum, sempervirens; all handsome honeysuckles.

Jasminum revolutum and *officinale*, the common white jasmine.

Vinca major and *minor*, the larger and smaller periwinkle; trailers.

EVERLASTING FLOWERS. This name is popularly given to certain plants whose flowers have the property of retaining their brightness and colour for many months after being gathered. They owe this quality to a hardness of their tissue, which has exceedingly little moisture to part with, and which, consequently, does not collapse or decay in the progress of acquiring perfect dryness. It is generally in the scales of the involucre of composite plants or in the bracts of others that this property resides. Those who wish to possess such plants will easily find the following in the gardens of this country.

Hardy annuals. *Helichrysum bracteatum* (yellow), *Xeranthemum annuum* (purple or white).

Hardy perennials. *Antennaria dioica* (pink), *triplinervis* and *margaritacea* (white). *Ammobium alatum* (white). *Gnaphalium stœchas* and *arenarium* (yellow).

Tender annuals. *Rhodanthe Manglesii* (red), *Morna nitida* (yellow), *Gomphrena globosa* (purple).

Greenhouse shrubs or herbaceous plants. *Astelma eximium* (crimson), *Helichrysum argenteum* (white), *ericoides* (pink), *sesamoides, proliferum*, and others (purple).

EVESHAM, a borough and market-town, having separate jurisdiction, locally situated in the hundred of Blackenhurst, in the county of Worcester, 15 miles south-east from Worcester, and 96 north-west-by-west from London. Evesham was formerly called 'Eovesham,' or 'Eovesholme,' an appellation derived from 'Eoves,' a swineherd of Egwin bishop of Wiccii, who was superstitiously supposed to have had an interview with the Virgin Mary on this spot. It owes its importance to an abbey that was founded here in 709, and dedicated to the Virgin.

The abbot and the convent received numerous grants of land, as well as ecclesiastical and temporal privileges from various kings and other benefactors. The last abbot but one was Clement Lichfield, who built the isolated tower, now almost the only relic of this once celebrated abbey. This tower, called the Abbot's Tower, is a beautiful specimen of the pointed architecture of the period immediately preceding the Reformation it is supported by panelled buttresses, adorned with windows having rich ogee mouldings, and surmounted by open embattled parapets and eight pinnacles. It was originally intended for a campanile, to which purpose it was converted in 1745. The tower is 110 feet in height, and is 22 feet square at the base.

A battle was fought near Evesham on the 4th of August, 1265, between Prince Edward (afterwards Edward I.) and Simon Montfort, earl of Leicester. Leicester placed King Henry III., whom he had made prisoner, in the van of his army, hoping that he might be killed by his son's troops, who were fighting for his release. However, the king was recognised nearly at the first onset by the prince, who rushed through the thickest of the battle to the assistance of his father, and soon placed him in safety. Leicester's defeat was complete, and he himself, as well as his son, fell in the field of battle.

The corporation claim prescriptive rights and privileges, but they were all confirmed by charter in the 3rd year of the reign of James I. They had the power of trying and executing for all capital offences, except high treason; and as late as 1740 a woman was burnt for petty treason. A court of record is held every Tuesday for the recovery of debts to 100*l.*; a court of session is also held for the borough on the Friday after the county quarter-sessions. The borough returned two members to parliament in the 23rd of

Edward I., and again in the reign of James I., since which time it has continued to do so. In 1831 there were 3991 inhabitants: the number registered is 359. Evesham is one of the few municipal boroughs the boundaries of which were not altered by the Reform and Municipal Corporation Acts. The town is pleasantly situated on the banks of the river Avon, over which is a stone bridge, which connects it with the parish of Bengworth, which is within the boundaries of the borough. The two principal streets are wide and clean, and the town has a cheerful appearance. The Vale of Evesham is famous for the richness of its soil; and large portions of land near the town are laid out in gardens, which supply the neighbouring towns and villages with vegetables and fruit. There are also some corn-mills, and a linseed-oil mill. The market-day is Monday. Fairs are held on the 2nd of February, the Monday after Easter, Whit-Monday, and the 21st of September: the latter is famous for cattle and horses.

The borough comprises the parishes of All-Saints, St. Lawrence, and Bengworth, in the archdeaconry and diocese of Worcester. The living of All-Saints is a vicarage, which, with the curacy of St. Lawrence, is of the clear annual value of 208*l.* The church is said to have formed part of the abbey: it is in the later style of English architecture, and has a tower, spire, and a handsome porch. The church of St. Lawrence is now quite in ruins, and forms a beautiful specimen of the ornamented Gothic. In the south aisle is the chapel of Clement Lichfield; it is only 18 feet by 16, but is (as Tindal says) of such elegance and delicacy of construction as a verbal description would but very imperfectly convey to the reader's imagination.

There are places of worship for Baptists, Quakers, Wesleyan Methodists, and Unitarians. The free grammar-school, endowed originally by Abbot Lichfield, was re-founded by Henry VIII., and again re-modelled by James I. The master receives 10*l.* per annum from the crown, a house, and some other emoluments. At Bengworth there is a school, founded by John Deacle in 1709, for poor children of that parish. There are also several donations to the poor, and for apprenticing children.

In the parish of Bengworth was a castle belonging to the Beauchamp family, but it was destroyed by Abbot William D'Andeville in 1169, and the site was converted into a burying-ground, for which we believe it has continued to be used down to the present day. (For a full account of the abbey and antiquities, see Tindal's *History of Evesham.*)

EVIDENCE (*Judicial*). Evidence, in jurisprudence, denotes the means by which facts are ascertained for judicial purposes. The practical importance of the subject is obvious from this definition; and it has accordingly not only attracted much attention from judicial writers, but has formed a prominent part of the systems of jurisprudence of most civilized countries, though the particular rules of evidence adopted have varied according to the constitution of the tribunal by which judicial truth is to be ascertained. Thus the Roman law, in which facts are ascertained for judicial purposes by professional judges, contains (so far as we now know it) few regulations respecting evidence, the whole subject being comprised in one short chapter of the Digest, which lays down several positive rules for the exclusion of witnesses within prescribed degrees of consanguinity to the litigant parties. In the common law of England, where facts are ascertained by juries, the body of rules and restrictions denominated the law of evidence has been gradually established within the last two centuries. Previously to that time, in the infancy of the trial by jury, as we understand that institution, the only positive rules respecting evidence were those which related to the two witnesses in treason required by statutes passed in the reign of Edward VI. This fact of the gradual development of restrictions upon the admission of testimony seems to show that, in this country at least, the tendency of civilization has been to contract and not to enlarge (as some writers have supposed) the rules of judicial evidence. The accounts of our earlier judicial proceedings contained in the State Trials sufficiently prove that it was the practice formerly to admit without scruple or question every species of testimony; whereas the present law of evidence is almost wholly composed of restrictive rules.

In giving a compendious view of the principles of the English law of evidence (which are the same at equity as at common law, and in criminal and civil proceedings) it is proposed—1. To enumerate the limitations which it prescribes to the competency of witnesses; 2. To give a brief summary of the principal rules by which the reception of oral evidence is governed; and 3. To state the principal rules which relate to written evidence.

I. *Of the competency of witnesses.*—The general rule of English law upon this subject is, that all persons may be witnesses in courts of justice who have sufficient understanding to comprehend the subject of their testimony, and sufficient religious principle to ensure a right sense of the obligation of an oath to speak the truth. Thus very young children are admissible as witnesses, if they have a competent knowledge of the nature of an oath, and a religious apprehension of the consequences of falsehood. All testimony, by the law of England, must be given under the sanction of an oath; but the form of the oath is immaterial, and nothing is required beyond a persuasion upon the mind of the witness that in swearing to the truth of what he states he is appealing to a Divine Being able to punish him for falsehood.

To the general rule of the admissibility of all persons of sufficient intellect and religious belief there are several important exceptions. In the first place, a husband cannot be a witness for or against his wife, nor a wife for or against her husband; a rule which is said to arise from the identity of interest subsisting in such a connexion. However, in criminal prosecutions founded upon personal violence committed by either of these parties upon the other, such testimony is admitted upon the ground of necessity. Secondly, in actions at the common law, a party to the suit cannot be examined as a witness; but in courts of equity defendants in a cause may be made witnesses upon a special application for that purpose; and in those courts, if a plaintiff consents to be examined as a witness his evidence may be admitted. Thirdly, a person cannot be a witness who has been convicted of treason or felony, or of any offence which involves the *crimen falsi* (such as perjury or cheating), or which is liable to a punishment which the law considers infamous, as whipping, branding, or the pillory. This principle of exclusion, which is derived from the Roman law (*Digest*, lib. ii., tit. *De Testibus*), is now of little practical importance, as the recent statutes have enacted that a pardon in felons, or the actual endurance of the punishment in felony or misdemeanour, excepting perjury or subornation of perjury, shall have the effect of restoring the competency of the party as a witness. Fourthly, the law of England excludes the evidence of those who have a direct interest in the result of the proceedings in which they are called to testify. The indefinite state of the rule respecting the nature of the disqualifying interest has led to much perplexity in its practical application.

The principle however which is illustrated by a great variety of cases, is, that, in order to disqualify a witness on the ground of interest, he must either be directly and immediately benefited by a result of the proceeding favourable to the party who calls him, by exonerating himself from a liability to costs or to some process founded upon the decision of the cause in which he is called to testify; or he must be in such a situation as to be able to avail himself of the decision of the cause, by giving it in evidence in support of his own interest in some future litigation. The first of these alternatives is, in fact, nothing more in principle than a part of the same proposition which excludes the parties to a suit from being witnesses; for where the determination of the suit in one way directly affects the witness in interest, he is in a certain sense a party to it, and would, in fact, be testifying in his own cause. The second section of the rule which is peculiar to the law of England, and first appeared in practice about fifty years ago, is of more doubtful expedience. It is much more exclusive in its operation than the former, and is objectionable and inconvenient in practice by introducing into the question of the competency of a witness in a particular action the complicated and embarrassing process of considering his position in every supposable litigation which may afterwards affect him as arising out of that action. With the view of removing the practical difficulties arising from this objection, it was enacted by the stat. 3 & 4 Will. IV., c. 42, § 26, that 'if any witness shall be objected to as incompetent, on the ground that the verdict or judgment in the action on which it shall be proposed to examine him would be admissible in evidence for or against him, such witness shall nevertheless be examined; but in that case a verdict or judgment in that action in favour of the party on whose behalf he shall have

been examined, shall not be admissible in evidence *for* him; nor shall a verdict or judgment against the party on whose behalf he shall have been examined be admissible in evidence *against* him. By the 27th section, it was enacted that the name of every witness objected to as incompetent, on the ground that the verdict or judgment in the cause in which he is examined would be admissible in evidence for or against him, shall, at the trial, be indorsed on the record on which the trial shall be had, together with the name of the party on whose behalf he was examined, and shall be afterwards entered on the record of the judgment; such indorsement or entry to be sufficient evidence that such witness was examined in any subsequent proceeding in which the verdict or judgment shall be offered in evidence.

II. *The principal general rules by which the reception of oral evidence is regulated.*—The first general rule (which applies equally to written as to oral testimony) is that all evidence produced must be relevant to the point at issue between the parties. The object of special pleading by the common law is to reduce controversies between parties to particular issues, or propositions of fact affirmed by one and denied by the other, which are to be decided by the jury; and the rule of evidence, that the proofs in the cause must be strictly confined to these issues, is founded upon obvious reasons of justice as well as convenience. Secondly, the affirmative of every issue is to be proved; that is, the party who asserts the affirmative of a proposition is to bear the burthen of proving it. This principle is taken from the civil law; 'Ei incumbit probatio qui dicit, non qui negat.' Thirdly, in proving a fact, the best evidence of it must be given of which the nature of the thing is capable. Thus, a party is not permitted to prove the contents of a deed by a copy, and still less by oral testimony, where the deed itself may be produced; nor to prove the execution of a deed by any other person than a subscribing witness, when he is living and producible. This rule is justified by the presumption which the offer of secondary evidence raises, that the production of the best evidence might have prejudiced the party in whose power it is, had he produced it. This rule is not, however, to be understood as requiring that all the evidence which can be given upon the fact in dispute should be produced; as, for instance, if there are several attesting witnesses to a deed or other contract, it is not necessary that more than one should be called. Fourthly, hearsay testimony, which is a statement on oath of what an absent person has said respecting a fact to be proved, is, in general, excluded both on the ground that the witness to the actual fact does not declare his knowledge upon oath, and also because he is absent from the cross-examination of the party who is to be affected by what he states. To this rule, however, there are the following exceptions:—1. The declarations of persons who are in imminent danger and under the apprehension of immediate death, and who are therefore considered to be speaking under as powerful a religious sanction as the obligation of an oath; 2. The declarations of deceased persons, and made against their interest; as, for instance, charging themselves with the receipt of money on account of third persons, or acknowledging the payment of money due to themselves; 3. The declaration of deceased persons respecting rights of a public nature, such as the boundaries or general customs of a manor or district; 4. The declarations of deceased persons on questions of pedigree, or family occurrences of antient date before the memory of living witnesses, such as births, deaths, or marriages. With respect to the two last exceptions, however, evidence of declarations of this kind is inadmissible, if they have been made *post litem motam*, that is, after the matter to which they relate has become the subject of litigation.

III. *Written evidence consists of records, documents under seal, as charters and deeds, and writings not under seal.*—Acts of parliament are records of the highest nature, being the memorials of the legislature; but a distinction is made with respect to evidence between public and private statutes. A public statute requires no express proof in courts of justice, every one being presumed to know the law which he is bound to observe; as to them, therefore, the citation of the statute itself is in all cases sufficient. But private acts of parliament are considered as documents relating to individuals, and must therefore be proved by copies compared with the original roll of parliament. A second and inferior species of records is the proceedings of courts of justice, which are proved by exemplifications, sworn copies, and office copies. Exemplifications are transcripts of the records of different courts, accredited by having the seals of such courts attached to them. Sworn copies are transcripts made by individuals who authenticate them upon oath, when they are produced in evidence. Office copies are copies certified to be true and accurate by an officer expressly entrusted for that purpose by an officer of the court to which the records belong. Charters and deeds are proved by the production of the instrument and proof of the execution by the party to be charged with it; but where the document is more than thirty years old, the execution need not be proved. The general rule is that the original deed must be produced, on the principle already alluded to of its being the best evidence; but this is subject to the following exceptions:—1. Where it has been lost or destroyed by accident; 2. Where it is in the possession of a party to a suit against whom it is sought to be produced, and who refuses to produce it: in either of which cases the contents of the document may be proved by a copy, or if no copy exists, by oral testimony. Deeds attested must, in general, be proved by one at least of the subscribing witnesses; but if the attesting witnesses be dead, or are not to be found after a diligent search, or are infamous, or for any other reason incompetent by law to give evidence, the execution of the deed may be proved by proof of the handwriting of the party. The proof of hand-writing, by the law of England, is peculiar. The testimony of persons skilled in hand-writing is wholly excluded, comparison of hands being inadmissible for the purpose. The course is that a witness acquainted with the writing of the individual in question, and who has seen him write, or who has had a written correspondence with him, shall testify to his belief that the document to be proved is in his hand-writing.

From the above summary of the principal rules of evidence existing in the English law, it will be observed that the system is extremely exclusive. Upon the subject of interested witnesses, the law does not merely caution and restrict the amount of credit to be given, but entirely rejects them from being heard wherever a pecuniary interest in the result of the cause, however small, is shown to exist. So also with respect to the reception of secondary and hearsay evidence, it sanctions no degree or kind of testimony at second-hand (except in the cases above enumerated), but excludes it under all varieties of circumstances. That the statement of an interested person is always to be received with caution, often with suspicion, and often with disbelief, may be readily admitted; that it should be always peremptorily rejected as unworthy to be heard is a different and much more questionable proposition. Again, it is true that we ought not to attach so much weight to hearsay evidence as to direct testimony, because it is beyond all doubt that the certainty of obtaining the truth is diminished, and that the means and causes of error are multiplied, in proportion as you remove from the actual observer and add links to the chain of testimony. 'Any testimony,' says Mr. Locke, in his chapter on the Degrees of Assent, 'the further off it is from the being and existence of the thing itself, the less force and proof it has. A credible man vouching his knowledge of it is a good proof; but if another, equally credible, do witness it from his report, the testimony is weaker; and a third that attests the hearsay of an hearsay is yet less considerable. So that, in traditional truths, each remove weakens the force of the proof; and the more hands the tradition has necessarily passed through, the less strength and evidence does it receive from them.' Admitting the justice of this objection to the effect of hearsay evidence, it may still be questioned whether its absolute and unconditional rejection for judicial purposes is justifiable. So also with respect to the mode of proving hand-writing, it might be unsafe wholly to rely upon the evidence of comparison of hands by persons of experience in that occupation, but there seems no good reason why such proof should not be *admissible* in aid of the present vague and unsatisfactory mode of proof by the general belief of a witness.

The most plausible reason for the exclusiveness of the English law of evidence is derived from the nature of the trial by jury, with reference to which it is contended to be safer to withdraw doubtful evidence altogether from their consideration, than to leave it to persons who are often uninstructed, and incapable of drawing correct distinctions upon the subject of testimony to form a proper estimate of its credibility. But this reason is founded upon an assumption not justified by the fact, namely, that the means of

proof actually legalized are infallible guides to truth; whereas, the truth is that many of them are quite as liable to lead to a false conclusion as those which are excluded. In this state of things, therefore, there seems no good reason why all practicable means of attaining to truth, however various in their degrees of effectiveness, should not be committed to juries. This seems indeed to be the growing impression in the profession; the inclination of the courts of late years being to let in as much light to a cause as possible, and to regard objections to evidence rather as matters of *credibility* upon which juries may exercise their judgment, than of *competency* to be wholly withdrawn from their consideration.

In the article EQUITY a reference is made to the present head of EVIDENCE, and we shall accordingly briefly state the manner of ascertaining facts in courts of equity, which differs from the practice in courts of law, where the witnesses are produced and examined orally before the court.

Witnesses in proceedings in equity are examined upon written interrogatories before the examiner of the court or before commissioners in the country, both examiner and commissioners being sworn to secrecy. The answers of the witnesses to these written interrogatories, or their depositions, as they are called, are taken down in writing, and form the only evidence for the plaintiff and defendant (except the defendant's answer, if the plaintiff choose to avail himself of it), which is admitted at the hearing of a cause.* The interrogatories are drawn by counsel, according to the instructions which he receives as to the facts which a witness is considered able to prove; but it frequently happens that the instructions are very defective, and the counsel is obliged to frame his interrogatories as well as he can, in order to elicit the proof of facts favourable to the party for whom he is employed. Though each several interrogatory, when well drawn, is framed for the purpose of establishing some single and distinct fact, written interrogatories cannot from their nature be otherwise than long and somewhat difficult to comprehend. In the oral examination of a witness, it necessarily happens that several questions must be asked consecutively for the purpose of completing the investigation into and the establishment of every important fact to which the examination is directed. Written interrogatories must be framed on the same principle, and therefore every subsequent part of an interrogatory must be framed on the supposition of every previous part being answered in some way; and consequently, it is hardly possible in written interrogatories to avoid what is called making them *leading*, and at the same verbose and cumbrous. These long interrogatories, it is proved by experience, are often imperfectly comprehended by the witnesses, and consequently their evidence is to some intents either incomplete or inaccurate, or both. The interrogatories which either party proposes to his witnesses are not known to the adverse party until the examination of all the witnesses on both sides is concluded, when *publication* is passed, as it is termed, and copies of all the depositions are delivered to the litigating parties under an order of the court.

Under this system, there is of course no cross-examination, in the proper sense of the term; for one party does not know what the witnesses examined by the opposite party have deposed, and cannot therefore effectually examine them, as in a court of common law, where the cross-examination of a witness follows and is founded upon what the witness has stated in his examination in chief. If a party to a suit in chancery will cross-examine a witness who is produced by his adversary for examination, he must examine him on written interrogatories, without knowing what interrogatories have been proposed to him by the opposite party, and without knowing what he has said in his depositions in chief. Such a cross-examination must be in general altogether useless, and often dangerous to the interest of the party making it; unless his object is to ascertain that the witness is an incompetent witness, or unless the witness is one whom he would himself have examined in chief. Under the 32nd Order of the 21st of December, 1833, the last interrogatory before that date commonly in use is in future to be altered as follows: 'Do you know or can you set forth any other matter or thing which may be of benefit or advantage to the parties at issue in this cause, or either of them?' &c. A party however is not bound to insert this interrogatory; and indeed no great harm will result if it is never used. Owing to various causes, such as disinclination on the part of a witness to give himself further trouble, particular affection to one of the litigating parties, or forgetfulness, it might have been anticipated that this general interrogatory would fail in its object; and so far as it has been used, such is said to be the case.

This mode of ascertaining facts in suits in equity is evidently very defective, and has been the subject of considerable complaint and of lengthened inquiry; but hitherto nothing has been done to amend the system.

(See *Minutes of Evidence taken before the Chancery Commissioners, annexed to their Report of* 1826; and a recent pamphlet (1837) by W. A. Garratt, entitled *Suggestions for Reform in Proceedings in Chancery.*)

Those who may be inclined to follow this subject further will find it discussed at great length and with much acuteness in Bentham's *Rationale of Judicial Evidence*. The full development of the English law of evidence is contained in the treatises of Mr. Phillipps and Mr. Starkie.

EVIL EYE. It was an antient superstition that certain persons were endued with the power of injuring those on whom they cast a hostile or envious look. The eyes of such persons were supposed to dart noxious rays on every object on which they were fixed. This power of injuring with the eye was called *Bascania* (Βασκανία) by the Greeks, and *Fascinatio* by the Romans. Several writers who have collected the testimonies of the antients concerning it (as Potter, *Archæologia Græca*, lib. ii. c. xviii., and Alsarius, 'de Fascino,' *Grævii Antiq. Rom.*, tom. xii. p. 885), may be consulted for particulars. Those who enjoyed great prosperity, or met with any extraordinary good fortune, and such as were too much elated by praise and flattery, were more particularly liable to the effects of fascination. Hence when the Romans praised any thing or person, they used to add, *Præfiscini* or *Præfiscine dixerim*, to avert any fascination that might ensue, and to prove that their praise was sincere.

It is remarkable that the same superstition prevails to the present day in several parts of the world, even in the northern part of our island, and in Ireland. In Greece it is at present called *kako mati* (κακο ματι), and its effects are averted by spitting, in the same manner as was practised by the antients against fascination (Theocr., *Idyl.* vi. 39) and ill omens of every kind. In Italy it is called *mal-occhio*, and among the lower orders of people its effects are supposed to be very powerful and fatal. When praise is bestowed on beauty, riches, or any other advantages, the person praised immediately exclaims, 'se mal-occhio non vi fosse,' from an apprehension that the praise may not be sincere, but proceeds solely from a malicious intention to injure. This exclamation is accompanied with a sign of the hand, or by holding up pieces of coral, shells, or various kinds of stones worn as amulets.

The belief in fascination is extremely antient, and in the opinion of some is connected with the story of Medusa and the Gorgons, whose eyes caused immediate destruction. From this source the superstition of the evil eye is probably derived.

Virgil alludes to this superstition in his third Eclogue:—

'Nescio quis teneros oculus mihi fascinat agnos.'

Scot, in his 'Discovery of Witchcraft,' has one or two passages relating to it. He says, p. 35, 'The Irishmen affirm that not only their children, but their cattle are (as they call it) *eye-bitten* when they fall suddenly sick.' It is likewise mentioned in Martin's 'Description of the Western Islands of Scotland,' in Heron's 'Journey,' vol. ii. p. 228, and in several volumes of the 'Statistical Account of Scotland,' as still believed there.

'Nothing,' says Dallaway, in his 'Account of Constantinople,' 4to. Lond. 1797, p. 391, 'can exceed the superstition of the Turks respecting the Evil Eye of an enemy or infidel. Passages from the Koran are painted on the outside of the houses, globes of glass are suspended from the ceilings, and a part of the superfluous caparison of their horses is designed to attract attention, and divert a sinister influence.'

(Millingen's *Observations on an Antique Bas-relief, on which the Evil Eye, or Fascinum, is represented; Archæolog.* vol. xix. p. 70—74: Brand's *Popular Antiquities*, 4to. edit. vol. ii. p. 400—403.)

EVIL, KING'S. [SCROFULA.]

EVILMERODACH. [BABYLON, HISTORY.]

* The execution of written instruments, not wills, may be proved at the hearing by an attesting witness; or where the instrument is not attested, the hand-writing of the party may be so proved also.

EVOLUTE. [INVOLUTE and EVOLUTE.]

EVOLUTION. [INVOLUTION and EVOLUTION.]

EVOLUTIONS, MILITARY, are the movements made by any body of troops either acting by itself or in conjunction with other bodies, for the purpose of arriving at or of retiring from a field of battle, or of placing itself in a position to act offensively or defensively against an enemy.

The circumstances attending the great movements of armies along their lines of communication, and the dispositions of the troops on the field of battle, are developed under the words STRATEGY and TACTICS. The present article will therefore comprehend merely a description of the manner in which the principal evolutions of a battalion of infantry, a regiment of cavalry, and an entire army, are performed; and will conclude with a short account of the movements of light troops in the field.

Evolutions of a Battalion.—When a battalion formed in line has to march in that order towards the front or rear, in order to ensure exactness in the movement three directing serjeants post themselves a little way in front of the centre of the line, and observing some object in the required direction, they advance directly towards it, the battalion following and keeping itself perpendicular to the line of march. While the battalion is thus moving in line, the two flanked companies are wheeled backwards, and made to march in files perpendicularly to the line of the battalion, in order to cover it; and on a halt being ordered, they face towards the enemy.

This order of march can of course only take place where the country is open; when partial obstacles occur, the troops near them necessarily form in file till they have passed them, and afterwards they wheel into the line; but when the obstacles are of great extent, and occur frequently, it is evident that the march of the battalion should be in column.

Columns formed for this purpose are designated columns of companies, of subdivisions, and of sections, according as their breadths, or the extent of their front, is equal to that of a whole, a half, or any portion of a company; and they are said to be at open order, at half, or at quarter distance, according as the intervals between the companies or their divisions are equal to the whole, to one-half, or to one-quarter of the breadth of the column. The order is said to be close when the several divisions are at the distance of one pace only from each other in the length of the column.

The wheel from line into column, and the converse, when the battalion is at a halt, must obviously be performed by causing the divisions to describe a quarter of a circle on their respective pivots. But when a battalion in column is on the march, and it is required to change the route, should the divisions be at the full distances from each other, that is, at intervals equal to the length of a division, it is necessary that the first division, after having described on its pivot an angle equal to that which the new direction is to make with the former, should march forward as soon as the wheeling pivot of the next division has arrived at the like pivot of the first division: the second division then wheels and marches in like manner, and so on. The same rule may be followed when the divisions are at less than full distance, provided the angle which the intended direction of march makes with the former is sufficiently obtuse to allow the divisions to describe the required angle without interfering with one another, otherwise the wheeling must be made by parts; the first division describing a portion of the angle corresponding to the required change of direction, then marching forward a few paces, and completing the wheel, the other divisions doing the same in proportion as they arrive at the ground where the preceding division performed the evolution. The wheelings may be made upon either extremity of a company or subdivision, and they may take place either forward or backward, according to circumstances; occasionally also a company is required to perform a wheel upon its centre, in which case one-half wheels backward, and the other half forward; but in all cases the wheeling pivots are to remain dressed, or in one line.

When a battalion is formed into a column for the purpose of an attack, it is called a column of manœuvre; and when so formed in order to move along a road or through a defile, a column of route. In either case the column may be in open order, at half, or at quarter distance, or in close order; and in the first formation the column of course occupies in length an extent of ground equal to that which it occupies in line, minus the length of the first division. Columns at half, or at quarter distance, or at close order, have the convenience of moving upon less space than the open column, with equal capacity of forming in any manner that may be required for resisting an attack; and their compact order enables them to avoid the evils attending the loss of distances which may occur with an open column, from the inequalities of the ground.

The battalion in line may be formed into a single or double column: the former upon or in rear of either flank company, and the latter upon the two centre companies or the two centre subdivisions. In either case the column is equally fit for its purpose, and the preference of one to the other must depend upon the ground or upon the point to which the movement is to be directed: the single column, however, can always be diminished to the smallest degree, according to the breadth of the defile; whereas the double column, if much diminished, may be in danger of becoming disordered by the intermixture of the files. For an attack, the column formed on the centre of a battalion can be more rapidly brought to bear upon the required point than a column formed on one of the wings, seeing that the divisions in line have but half the distance to march through in order to arrive at their places in the column, and a corresponding advantage is enjoyed when the battalion has to deploy from column into line.

It is to be observed that the front of a column should never be unnecessarily contracted, and battalions should be so instructed as to render it indifferent whether the first or second rank is in front, or whether the right or left flank division (of the line) is at the head of the column; but occasions may occur in which the order of battle is to be reversed, and then the divisions must necessarily change their positions by countermarching.

A battalion in column at open order is formed in line by merely causing the divisions to wheel upon their respective pivots; but a close column of companies, having its head already in the alignement, is deployed by causing the several divisions to move out by files to the right or left parallel to the alignement; each division having got beyond that which was in front of it halts, and then marches up to its place in the line. The deployment may take place upon any one of the companies, which then remains at rest.

Echellon movements are performed when it is required to advance or retreat obliquely, and when a change is to be made in the position of a line, corresponding to a wheel of the whole about some given point: the movements are made to the front when an enemy's flank is to be turned, and to the rear when it is required to cover the flank of the line itself. Echellon movements are the safest that can be adopted by troops in presence of the enemy, as they have the advantage of preserving a general front during the march. A direct echellon, as it is called, may be formed by the different companies or subdivisions marching from their position in the line towards the front or rear, keeping parallel to that position, and halting successively when arrived at the required distances. The oblique echellon is formed by causing the different companies or subdivisions to make a wheel upon their pivots through any angle less than a right angle, but generally not more than one eighth of it; the parallelism of the divisions being ensured by causing a non-commissioned officer of each division to place himself, as the case may require, before or behind some given file, suppose the eighth, from the pivot, and to take a given number of paces on an arc of which that pivot is the centre; the division is then to wheel up to the place where he halts.

An important evolution of a battalion is that of placing itself in a square or oblong form, with the men on the four sides facing outwards, so as to be enabled to resist an enemy who may attempt to surround them. This figure is always formed hollow, or so as to enclose a space in which baggage or treasure may be placed for security; if otherwise, it is evident that great numbers of the men would be useless, since they could not use their fire-arms.

When a battalion in line is to form a hollow square, the manœuvre may take place upon any given company, or upon one formed of the two contiguous subdivisions of two companies, which then for the moment remain at rest; while the other companies break out of the line and march, some to the front and some to the rear of the troops who are stationary, so as to form with them a column of companies at quarter distance. The second division in the

column closes up to the first, and these two form the front of the square; the two rear divisions then face outwards, the last but one closes up to the last, and these two form the rear of the square. The remaining divisions wheel outwards, and constitute the two sides of the square or oblong, which is thus formed four deep. If the square is to resist an attack of cavalry, the two front ranks kneel and slope their firelocks outwards till, at the word of command, they fire a volley: the men in the two standing ranks fire by files, or independently of one another. It is said that Bonaparte, while in Egypt, formed his infantry in squares whose sides were six ranks deep, in order to resist the Mameluke cavalry.

When several battalions form themselves into squares, they dispose themselves either en echellon or in two lines, each square in the first line being at some distance in front of the interval between two squares in the second line; by which means the fire of one square may defend the face of another.

Squares may be reduced to columns, and these to line, by reversing the processes above mentioned. One square consisting of several battalions is not recommended, as much time would be spent in its formation, and the safety of the troops might be endangered should they be attacked while so occupied.

A battalion in column may be obliged to engage in a street or narrow pass where deployment is impossible. In this case, if the column is advancing, the two front companies or divisions fire, the first kneeling and the other standing; after which, on a favourable occasion presenting itself, the whole column moves forward: if the column is to retire, the first division, after firing, faces outwards, half to the right and half to the left; these subdivisions file away to the rear, where they re-load; the second division fires, then files to the rear in like manner, and so on.

Evolutions of a Regiment of Cavalry.—The movements of cavalry on a field of battle, like those of infantry, consist of marches to the front or rear, in line or en echellon; deploying from open or close columns into line, and the converse.

If it be required to form a line for attack from an open column of divisions upon any particular division, those divisions which are in front make a wheel forward equal to three-eighths of a circle, and those which are in rear wheel forward one-eighth; all the divisions being thus parallel to each other, they march in this order up to the alignement on the division which remained stationary, wheeling into it as they arrive. On the contrary, if the column be in retreat, and it be required to form a line on the defensive from an open column of divisions, suppose on the first division of the first or leading squadron, all the divisions are to make a wheel equal to one-eighth of a circle, and in this order march up and wheel into the alignement. It must be observed that the line first formed in these cases is to be at the distance of two horses' length in rear of the intended alignement, in order to allow the officers in front of each squadron to dress the troops, which they can do more correctly than the officers of divisions who are in the line itself.

To deploy in line to the front from a close column of squadrons for an attack, suppose on the second squadron; all the squadrons except this break into divisions by threes, as it is called (that is into divisions consisting of three horses in each of the two lines); the divisions of the first squadron wheel a quarter circle to the right, and march in that order till they get beyond the squadron on which the line is to be formed; the third and fourth squadrons also break into divisions in like manner, wheeling to the left, and marching till they get opposite their respective places in the intended line, which is supposed to be in front of the ground occupied by the first squadron, and into this line all the squadrons now march. But if the line be required to be formed on the rear of the regiment when in retreat, for the purpose of defence, suppose on the fourth squadron, this squadron must then change its front by a countermarch, the others break into divisions, wheel a quarter circle, and march to the left till they come opposite their proper places in the intended alignement, into which they then march as before.

The evolutions are made as above stated when the regiment is in column with its right in front; but it is easy to apply the precepts to the contrary case.

The reason why the squadrons are made to break into divisions by threes is that, since the breadth of three horses is about equal to the length of one, each division of three can wheel within a space equal to that which it occupies in line: the practice however has been objected to on account of the extension of the files which is produced when marching in this order. Movements by the usual divisions or sub-divisions have been preferred on this account, but the former method prevails.

Evolutions of an Army.—The general principles upon which the evolutions of armies, divisions, or brigades are performed, correspond nearly to those of single battalions. When a whole line has to advance parallel to itself, one of the battalions is considered as the regulator, and all the others should conform to its movements. The commander of this battalion must therefore devote his whole attention to the preservation of the direction which has been indicated by the general commanding the army, while the flank officers of the other battalions must endeavour to preserve the regularity of their own battalions by the line of the colours.

Columns of route or manœuvre are formed of any number of battalions, each in column of companies or of sub-divisions, in rear of one another; and if the columns are at close order, the interval between every two battalions is only six paces, or the same as if all the troops were drawn up in line. If the distances of the companies are equal to one quarter of the length of their front, the intervals between the battalions are twelve paces; but when the columns are at open order, the intervals of the battalions should be equal to the breadth of the column, together with the six paces which should be the intervals between the battalions in line. Such columns as the last can instantly be thrown into line by each company making simply a wheel on its proper pivot. When one general column is required to form into what is called a line of columns, the heads of all the columns must be placed in one alignement, but the distances of the several columns from one another in the direction of the line may, according to circumstances, be of any extent, from six paces (in which case the columns are said to be contiguous), to the proper distance for deployment, that is, a distance equal to the length of a column.

A column whose divisions are either at quarter distance from each other, or in close order, can always wheel into a line of columns, because each battalion, in performing the wheel, leaves room for the wheel of that which is in its rear; but a line of contiguous columns, when the depth of each battalion exceeds the extent of its front, cannot for want of room be wheeled into a single column. When such a manœuvre becomes necessary, the line of columns must open out to the right or left far enough to allow the wheel to be performed. When a line of columns is required to be changed into one column, for the purpose of performing a march towards either flank, the most convenient disposition would be that in which all the columns in the line stand with their right wings in front, if it is intended that the march should be towards the right; and the contrary, if it is to be towards the left, for then a simple wheel to the front brings the divisions into the alignement in their proper order.

When a column is on a march, the baggage should be in the rear; or if, on any account, it is placed within the line, it should be, together with the artillery which accompanies the column, in the intervals between brigades, and never between the battalions of a brigade. The preservation of the original extent of a column in front is of importance, and defiling, in order to pass an obstacle, should be avoided if possible, on account of the loss of time which it occasions in fact, it will frequently happen that, on arriving at a stream, a ditch, or a bank, the obstacle will be more conveniently passed by extending than by contracting the front.

Echellon movements of an army are almost always those which are made when in presence of the enemy, the inequalities of ground generally preventing large bodies of troops, if it were otherwise adviseable to do so, from acting against one another in continuous lines. Like the echellon movements of battalions, those of an army may be either direct or oblique: the former are executed by advancing brigades, battalions, or companies parallel to and at unequal distances from their front; and this advance may be made from the centre of the line when it is intended to refuse both wings to an enemy, or from one flank when it

is intended to turn that of the enemy. The direct echellon may also be produced by posting columns in proper situations, ready for deployment, parallel to the enemy's position: the distances between the battalions in echellon should be sufficient to allow them to form squares chequerwise, so as to flank one another.

Oblique echellons of an army are formed by wheeling, and then marching in the new directions so as to gain ground obliquely towards a flank; each of the several bodies performing the manœuvre should not exceed a company, as it might be hazardous to present one flank of a large body towards an enemy in position, and thus expose the line to be enfiladed. And, as the enemy would endeavour to counteract the intended project of outflanking him, should he observe it, advantage ought to be taken of the localities to conceal some of the divisions, and to gain points of support for the bodies placed in advance of the rest of the army. When it is intended to refuse one wing, the battalions of that wing may retreat en echellon as far as necessary, and the artillery of that part of the line which is stationary should be ready to enfilade the enemy on his advance towards the retiring divisions. Movements of attack may be made in columns, which should deploy in line at from 1200 to 1400 paces from the enemy; the destructive effects of an enfilading fire preventing a nearer approach in column.

Generally speaking, the most convenient order for an army, whether on the offensive or defensive, is in column, provided the columns can be covered by the ground from the enemy's artillery; since it may be readily moved up to any given point of attack, while the enemy has few means of judging where that point of attack will be.

Changes in the front of a position, when under fire, are best effected by an echellon march of companies; but when the line is extensive, the battalions which are most remote from the new alignement, and which may be attacked by cavalry during the movement, should be marched up in columns of battalions, the divisions being at quarter distances from one another.

The retreat of a line is accomplished by causing each alternate battalion to retire, perpendicularly to the front, to a certain distance towards the rear, not exceeding 200 yards, that the divisions may be able to support each other by their fires; the remaining battalions protecting the retreat of the others, and then retiring as far as the intervals between the former battalions, who then retreat still further, and so on. The intervals in the lines should be occupied by light infantry; and if the enemy should press closely, the second line of the army, after the first battalions have passed through it, must contribute by its fire to the defence of the intervals in the first line.

This retreat by alternate battalions, or by half-battalions, is indispensable when it is made over a plain; and if the retreat is to be continued, defiles and commanding spots of ground must be occupied and defended as long as possible; by degrees the bodies may diminish their fronts and form themselves into columns of march.

If a gradual retreat of the whole line is not intended, on a flank of the army being attacked, that flank only may be retired in direct echellon by alternate battalions or half-battalions, beginning with that which is at the extremity of the flank attacked; the remaining battalions then retire, still en echellon, thus keeping the menaced flank refused to the enemy, taking care that the distances between the corps are not so great as to render it impossible for them to defend each other by their fire. Each body must repel an attack, if made upon it by infantry, by a counter-attack; if by cavalry, it may dispose itself in a square; or a new line may be formed in the oblique position, if it be thought best thus to resist a general attack of the enemy.

The movements of the second line of an army should correspond exactly to those of the first; the two lines always preserving their parallelism and distance. The second is however frequently kept in a line of columns of battalions, and is made to move in that order even when the first line is deployed.

The most proper stations for cavalry are on the wings of an army, because troops of this class are unfit for resisting an attack; and should they be compelled to retire when placed in the centre, there would be left an interval which the enemy might immediately occupy, and from thence enfilade the wings. This false disposition was made by the French at the battles of Hochstet and Minden, and was the cause of their defeat in those actions. Cavalry are generally employed in the operation of turning a line; and it is evident that this manœuvre must be more readily made from the nearest wing than from the centre.

Manœuvres of Light Troops.—To the light infantry and riflemen, or troops acting as such, are entrusted the guard of the encampments or cantonments. When an army is on the march they reconnoitre the country, repel any parties of the enemy which might get between the columns while advancing; and they check the pursuit of the enemy in a retreat.

When a battalion is employed as light infantry, not more than one-third of the men should actually engage as skirmishers; these extend themselves in line, in two ranks, to the right and left, from some given file, at any distance which may be appointed; or, if no order is given, at the regulated distance of six paces. The rest of the battalion is divided into parties, as supports, of which one is usually in rear of the centre, and another is towards each flank; and when the skirmishers have advanced about one hundred paces to the front, these supports follow them, and are themselves followed by a general reserve. Each of the supporting bodies and the reserve should be kept in compact order; and when the skirmishers retire upon their support, they form in sections in its rear. The skirmishers advance or retire, as the case may be, in one general line, and they should avoid standing exposed if any cover, as that of a hedge, ditch, or copse, can be obtained on the ground: for this reason, when obliged to cross an open plain, their line should make a simultaneous rush towards the spots where they may fire under cover. On open ground, they fire kneeling or lying down, the front rank man discharging his piece first, then retiring in rear of the second rank and loading: as soon as he has loaded he gives the word, ready, in a low voice, when the second rank man fires and loads, care being taken that the muskets of both ranks are not unloaded at the same time.

On the appearance of cavalry the nearest supporters and the reserve move towards the threatened part, and form squares; the skirmishers at the same time run to any cover from whence they may aid the supports by a cross fire.

When light troops have to advance across a bridge, or through a short defile, on arriving at the bank of the river, or at the entrance of the defile, the skirmishers lie down in line and fire; the supports, strengthened by the reserve, charge the enemy on the bridge, or in the defile, drive him back, and then form an extended line as skirmishers, while the former skirmishers pass the bridge or defile, and now constitute the supports and reserve. In retreating the supports pass first over the bridge or through the defile, covered by the skirmishers, and immediately deploy, in order to act as skirmishers themselves; the former skirmishers then rapidly pass, followed by the supports, and the whole form in column in rear of the present skirmishers, who then, by their fire, protect the retreat if it is to be continued.

E'VORA, the principal town of the province of Alentejo, in Portugal, is built upon an eminence in the midst of a fine open country, which produces wine, oil, and corn, and is south-west of the Serra de Osa, which forms part of the range which crosses Alentejo from east to west. Evora is an archbishop's see, has a college, two female houses of education, several good buildings, and a fine aqueduct, attributed to Sertorius, who for a time made this town, then called Ebora, his residence. Julius Cæsar, after his Spanish campaign, made Ebora a municipium, with the name of Liberalitas Julia. There is now at Evora a handsome temple of the Roman period, supposed to have been dedicated to Diana: the front presents an hexastyle of the Corinthian order, the columns remain, and the capitals are of very delicate workmanship, but the entablature is gone, and has been replaced by a rubble work with pinnacles in the Moorish style. (Murphy's *Travels and View of this Temple, with Copies of Roman Inscriptions found at Evora.*) Evora has about 12,000 inhabitants, some manufactures of hats and leather, and a considerable inland trade. It suffered greatly in the French invasion of 1808, for having attempted an insurrection against the invaders; many of the inhabitants were put to death. (Southey's *History of the Peninsular War.*) Evora lies on the road from Lisbon to the Algarve, and is about 80 miles south-east of Lisbon, 30 miles north of Beja, and 50 miles west by south of Badajos

EVREMOND. CHARLES de St. Denys, Seigneur de St. Evremond, was born April 1, 1613, at St. Denys le Guast, near Coutances, in Normandy. He entered the army early, and by his literary talents and sprightly wit, as well as bravery, acquired the friendship of Turenne, Condé, and other of the most distinguished men of that brilliant epoch. Condé made him lieutenant of his guards, for the sake of his society; and he fought with that great commander at the bloody battles of Rocroi and Nordlingen. But the prince, though fond of raillery at the expense of others, could not bear it levelled against himself; and St. Evremond, by an imprudent exercise of his satiric humour, lost his patron and his lieutenancy in 1648. In the wars of the Fronde he espoused the royal cause, and was rewarded with promotion and a pension. He incurred a three months' imprisonment in the Bastile by making too free with Cardinal Mazarin; but found means to reinstate himself in the minister's favour. Another indiscretion in ridiculing the treaty of the Pyrenees (unless, as has been said, there was some secret cause for his disgrace, and this was only a pretext), led to a second order for his arrest in 1661. He received timely notice, and fled, first to Holland, then to England, in which two countries the rest of his long life was spent. Louis XIV., though solicited by his most favourite courtiers to pardon St. Evremond, remained inflexible till 1689, when he granted the exile a tardy permission to return. But it was then too late for St. Evremond again to change the scene; and though in banishment, his life had all that he required for happiness. He was a favourite with Charles II., who gave him a pension of 300*l*., and his society was courted by the most distinguished wits and beauties of that reign; nor was he less fortunate in possessing the regard of William III., who had known him in Holland, and took much pleasure in his company. Devoted to the enjoyment of the present, and availing himself moderately of every source of social pleasure, he retained his faculties, mental and bodily, to the last, and died in his 91st year, September 20th, 1703.

St. Evremond was one of those who, aiming chiefly at success in society, leave no memorials sufficient to sustain the reputation which they have enjoyed in life. He possessed however extensive reading and an independent and acute judgment, as well as wit. His verses are deservedly forgotten; but his treatises on Roman literature and on the modern drama are ranked among his best works. His letters are among the most brilliant specimens of that style of composition in which the French have excelled. He appears to have been a disbeliever in revealed religion, but he was not a scoffer, and he checked wanton insult to religion in others. Neither was he, as has been said, an atheist; but some atheistical books were falsely published under his name long after he was dead. He never derived profit from the sale of his works, nor authorized their being printed; so that the earlier editions, which were all pirated, contain much that was foisted in by the booksellers to profit by his popularity. The first correct edition is that of Des Maizeaux, 3 vols. 4to., Lond., 1705, with a life prefixed, from manuscripts revised by the author and editor jointly, shortly before the death of the former. Des Maizeaux also translated the whole into English. (*Biog. Univ.*; see also Des Maizeaux's *Life* and Grammont's *Memoirs* for scattered notices of St. Evremond.)

EVREUX, a city in France, capital of the department of Eure, on the little river Iton, a feeder of the Eure, 51 miles in a direct line west by north of Paris.

Evreux is mentioned by Ptolemy and by Ammianus Marcellinus, in the Itinerary of Antoninus and in the Theodosian Table. It bore the name of Mediolanum, and was the capital of the Aulerci Eburovices. The name Eburovices was afterwards applied to their chief city, and in the middle ages appears under the corrupted Latin forms of Ebroicæ and Ebroas, from which is derived Evreux. It has been matter of dispute whether the old Mediolanum was on the site of the present city or at a village in the neighbourhood known by the name of Old Evreux; but the remains of a theatre and of several antiquities which have been discovered may be considered as showing that Mediolanum was close to, if not on the site of, the present city. Evreux came into the hands of the Normans, but the duke of Normandie, Richard I., severed it from the duchy and erected it into a distinct county in favour of his second son, from whose descendants it afterwards passed to the house of Montfort. In the beginning of the twelfth century (in 1119) it was burned by Henry I. king of England; and toward the close of the same century (in 1194 and 1199) it was twice destroyed by Philippe Auguste, king of France, who shortly afterwards acquired permanent possession of it. The county of Evreux was bestowed as an apanage on a branch of the royal family of France, which subsequently acquired the throne of Navarre; but on the death of Charles le Mauvais, king of Navarre, it reverted to the French crown. In the wars of the English in France, under Henry V. and VI., Evreux was repeatedly taken and retaken: the last time was in 1441, when it was captured, after a vigorous resistance, by the French, from whose hands it has never since passed away.

A great proportion of the inhabitants (who in 1832 were 7988 for the town, or 9963 for the whole commune) are persons of independent property. The houses are for the most part built of wood and clay or plaster. The streets are broad and beautifully neat. The city stands in the midst of gardens and orchards in a fertile valley watered by the Iton, which divides into two branches before reaching the town, and flowing on each side, under or near the walls, and afterwards reuniting, renders the position of the city insular Part of the waters of the Iton are conducted through the city by means of a canal.

The principal edifice is the cathedral, which was rebuilt by Henry I. of England, after he had burned the former one with the rest of the town: the nave alone retains any vestiges of early architecture: its massy piers and semicircular arches are evidently of Norman origin, and are probably part of the church erected by Henry. All the rest is comparatively modern. The interior is adorned with some elegant carving, both in stone and wood: there are some good specimens of painted glass.

The church of St. Taurinus (formerly attached to the Benedictine abbey of St Taurinus, founded in the seventh century) contains some valuable specimens of Norman architecture: the interior has been modernized. A portion of the monastic buildings serves as a seminary for the Catholic priesthood. The church of St. Gilles, now converted into a stable, presents some antient features worthy of notice.

Among the other remarkable buildings are the episcopal palace, the hospital, a fine new building, the office of the prefect, formerly the hospital, and the prisons. There are some handsome public walks.

The manufactures of Evreux are woollen cloth, woollen and cotton yarn, bed-ticking, calico, cotton velvet, hosiery, leather, paper, wind musical instruments (flutes, clarinets, &c.), and ivory and box-wood combs. Trade is carried on in these articles, and in grain, brandy, cider, perry, and linseed oil. There are seven annual fairs; the most important, that of St. Taurin, lasts eight days. There are a subordinate court of justice, 'une chambre consultative des arts et manufactures;' a central society of agriculture, sciences, arts, medicine, surgery, and pharmacy; a high school; a public library of 6000 volumes; and a botanic garden, at which courses of lectures on botany are delivered.

In the neighbourhood of Evreux, about a mile and a half from the town, is the Château de Navarre. Jeanne, daughter of Louis Hutin, king of France and Navarre, in which latter kingdom she succeeded her father, married the then count of Evreux, and built a château, which she called the Château de Navarre: this structure was, in 1686, levelled to the ground by its possessor, the duke of Bouillon, who erected the present building. Upon the emigration of his descendants, it became national property, and was given by Napoléon to the Empress Josephine, who resided here for a time. The house, which is of stone, is formal and ill proportioned; but the woods around are beautiful, the avenue noble, and the sheets of water extensive. The château is now deserted. Old Evreux appears to have been the site of a Norman and previously that of a Roman fortress. There are some remains of a Roman aqueduct and Roman medals in gold, silver, and bronze have been dug up.

The arrondissement of Evreux contains 11 cantons or districts under the charge of a justice of the peace; two of these are in the town of Evreux. It comprehends 287 communes, and had, in 1832, 118,397 inhabitants. The diocese comprehends the department of Eure: the bishop is a suffragan of the archbishop of Rouen. The foundation of the see is ascribed to the third century. (Dawson Turner, *Tour in Normandy*; Dulaure, *Histoire des Environs de Paris*; *Dictionnaire Géographique Universel*, &c.)

EX. [DEVONSHIRE.]

EXAMINATION. [EVIDENCE.]

EXANTHEMATA (*Exanthematous diseases*), ἐξάνθημα, an *efflorescence;* a term under which are comprehended the eruptive fevers, or the diseases commonly termed rashes. Rashes are superficial red patches, variously figured, and diffused irregularly over the body, leaving interstices of a natural colour, and terminating in cuticular exfoliations. Fever is an essential element in the definition of an exanthematous disease, as this term is usually employed by nosologists; but the writers on cutaneous diseases give to it a modified signification, and comprehend under it only those diseases which are properly termed rashes, whether those rashes are attended with fever, and whether they are contagious or not. Thus Dr. Bateman comprehends under the order Exanthemata measles, scarlet fever, nettle-rash, roseola or the rose, purpura, and erythema.

EXARCH was the title of the governor of Italy under the Byzantine emperors, established by Justinian after the reconquest of Italy from the Goths in the sixth century. The first exarch appointed was Longinus, A.D. 568. The residence of the exarch was at Ravenna, then a sea-port town, and the great entrepôt between Greece and Italy. The exarchs, who were generally chosen among the officers and favourites of the Byzantine court, were of course removable at the pleasure of the emperor, but several of them remained in their office to the end of their lives. Their administration was often marked by acts of oppression and treachery, the results of Byzantine corruption as well as of the peculiar difficulties of their situation. They were engaged in frequent hostilities against the Longobards who had invaded the greater part of Italy, and were also not unfrequently at variance with the popes, and their authority was often confined within the walls of Ravenna. At last, in the year 752, Ravenna being taken by Astulf or Astolphus, king of the Longobards, the exarchate, as well as all dominion of the Byzantines over North Italy, was at an end; but the Greek emperors still retained possession of parts of Apulia and Calabria, where Bari became the residence of the catapan or Byzantine governor. (See *Chronological Series of the Exarchs* in Petau, *Rationarium Temporum.*)

EXCAVATIONS. [FOUNDATIONS.]

EXCENTRIC. [PTOLEMAIC HYPOTHESIS.]

EXCENTRICITY, a term applied to the ratio which the distance between the centre and focus of an ellipse or hyperbola bears to the whole semiaxis. [ELLIPSE; HYPERBOLA.] With regard to this word, it should be noted that in the older writings on conic sections it was not the *ratio* of these two lines, but the former of them, namely the distance between the centre and focus, which was called the eccentricity.

Let a be the semimajor axis of an ellipse or hyperbola, b the semiminor axis, and e the eccentricity; then

$$\text{in the ellipse } e^2 = 1 - \frac{b^2}{a^2}$$

$$\text{in the hyperbola } e^2 = 1 + \frac{b^2}{a^2}$$

EXCESS. For a peculiar mathematical use of this term, namely, the *spherical* excess, see SPHERICAL TRIANGLE.

EXCHANGE. The term exchange is commonly employed by merchants to designate—first, the written instrument by which the debts of persons residing in different countries or in different parts of the same country are brought to a condition for final liquidation; and, second, the varying price of such negotiable instruments in the market.

The first division of the subject is discussed under the title BILL OF EXCHANGE; the following article will comprise the second, and will include an investigation of the principles on which exchange transactions are based.

International, or, as it is commonly called, foreign trade, arises out of the unequal or exclusive capacity of different countries to produce the various objects of desire. One country, for instance, has abundance of coal and iron; another enjoys a climate especially adapted to the culture of the vine; whilst a third possesses some peculiar advantages for the growth of wheat. If interchange were not restricted by legislative enactments, if trade were perfectly free, the first country would supply the other two with iron wares, taking from the second wines, and from the third wheat; whilst the two last would in like manner exchange their respective productions with each other.

Peculiarities of soil and climate, abundance and cheapness of land or of labour, the exclusive presence of certain animals, vegetables, or minerals, all give rise to interchange between nation and nation. Every country has some peculiarity which gives it an advantage with respect to that peculiarity over all other countries: it is by means of interchange that such advantages are shared equally among all.

In the article BILL OF EXCHANGE, already referred to, we have explained how this mode of settling accounts between parties in different countries arose; and the various legal rights of the parties to a bill of exchange are also in that article fully explained.

In investigating that part of the subject which belongs to the present article it is necessary to bear in mind that different countries make use of different coins—different in denomination, in weight, and consequently in value. The pound, for instance, is the money of England, the franc that of France, the dollar that of America. These several coins contain very different quantities of the precious metals. The dollar, for instance, contains about five times as much silver as the franc, whilst the guilder contains only twice as much. The value of a currency depends on the quantity of pure metal contained in the coin which forms its legal tender, alloy being left wholly out of the account.

In the language made use of by merchants, the existence of a *par of exchange* is usually assumed. Between two countries making use of the same metal a par may exist; but between two countries one of which makes use of gold and the other of silver an invariable par cannot exist.

The following is a statement of the contents, in pure silver, of the several coins forming the money of account of the several countries specified:—

	Grains.
Franc of France . . .	69·4
Mark of Hamburg . .	105·15
Florin of Amsterdam . .	146·8
Dollar of America . .	370·1

Hence the mark is worth, in Paris, 1·515 francs; in Amsterdam, 14 stivers 5 pfennings; and in New York, 28·2 cents.

Gold is now a legal tender in America, and the sovereign is by law worth 4·87 dollars, making the eagle of 10 dollars worth 2*l.* 1*s.* 0¾*d.*; the dollar (of gold), 4*s.* 1¼*d.*; and the 100*l.* sterling equal to 487 dollars; all of which are different expressions for the *par* between England and the United States—both being gold-using countries.

We have said that a par of exchange cannot exist between two countries making use of different metals as the standard of their respective currencies; we shall now explain the reason. Gold is the standard in England. The silver coin of England possesses a conventional value independent of the market value, and the latter may fluctuate without affecting the former. Foreign coins, the franc or the guilder for instance, possess no such conventional value. They are merely a commodity liable to fluctuation with the varying price of silver.

Within the last ten years the price of silver in the London market has varied from 4*s.* 10½*d.* to 5*s.* 1*d.* per ounce of 444 grains pure, the medium price being 4*s.* 11¾*d.* to 5*s.* The extreme prices give the following results:—

Price of Silver per oz.	Value of Franc.	Value of £1.
s. *d.*	*d.*	*f.*
4 10½	9¼	26·30
5 1	9·54	25·15

Thus making a fluctuation in the so-called par of exchange of rather more than 4½ per cent.

The assumption of a par of exchange where no par can exist is likely to lead at times to great inconvenience. Suppose, for instance, that the par between Paris and London be assumed at 25·58fr., which is about the medium. Suppose further that exchange is quoted at 26·30fr.; what would be the inference? Why that exchange was 2·8 per cent. in favour of England, and (the cost of transmission being much less than the above difference) that consequently bullion was about to pour into London. But sup-

pose that at the same time the market price of silver had declined in London to 4*s.* 10½*d.* per ounce, and gold in Paris had advanced in a like ratio, what would be the effect? Why the supposed premium in favour of England would vanish, and the par, for the time being, would be brought to coincide with the actual rate.

Though there exists no invariable par of exchange, it is extremely useful to the merchant to know the average value of the currency of every country with which he trades, in order to ascertain what may be called the *approximate par*, which must be the pivot around which fluctuations will necessarily turn. This approximate par (a term which we make use of for the sake of conforming, as nearly as truth will permit, to the language familiar to merchants) should be grounded on the average value of a currency taken on a period sufficiently long to include fluctuations from highest to lowest. To the approximate par so taken will be the tendency of the rate of exchange to conform.

The approximate par of exchange will be liable to be affected by four pairs of circumstances, in addition to a rise and fall in the price of the precious metals. These are—

1. Changes made by the supreme authority in the quantity of the pure metal contained in the coin by way of increase or diminution.
2. Depreciation from the use of paper money, and restoration.
3. Clipping, and restoration.
4. Wear and tear, and restoration.

1. *Legal Changes in the Coinage.* Governments have not unfrequently found the diminution of the quantity of the metal contained in the current coin an easy way of getting rid of improvidently contracted debts. The English pound was once a troy pound of silver; it is now about four ounces. The French livre, once probably the same quantity, is now less than a *seventieth* part of a lb. By what a succession of frauds must this change have been brought about!

A government having borrowed *so many pounds* of its subjects would find it a very convenient thing, when the day of payment should come round, to call ten or fifteen shillings 'a pound;' and as it would have all the debtors in the kingdom on its side, popularity would be divided on the measure. But although creditors at home may be compelled to submit to this robbery, creditors abroad cannot. Their contract is to receive a given sum of the money of their own country, and the only effect of any debasement will be that the foreign debt will require more of the debased money to liquidate it; in other words, exchange will fall in the ratio of the debasement. Thus suppose the sovereign to be reduced in weight 10 per cent., exchange on the Parisian Bourse, if at 25·58f., would fall to 23f. 2c. If, on the other hand, the franc were reduced, exchange would rise.

We can illustrate this by two historical facts. Formerly the Spanish dollar contained as much silver as 4*s.* 6*d.* sterling, and consequently the average value of 100*l.* was 444 dollars 44 cents. The weight of the dollar however has been since reduced, and it now contains only as much silver as 4*s.* 2*d.* sterling, so that that the average value of 100*l.* sterling is now 480 dollars; the difference being 8 per cent. The old language of quotation however has never been wholly abandoned by the American merchants. They still assume the old par, so that when exchange is quoted at 10 or 11 per cent. premium—a premium which, as we shall presently see, could not be maintained for an hour—it is in fact at 2 or 3 per cent. only (the remaining 8 per cent. being nominal); and when it is quoted at 6 or 7 per cent. premium, it is in fact at 1 or 2 discount. The other fact to which we allude is the recent adoption of a gold standard in the United States, at a rate, compared with silver, to render the American currency practically debased.

Before the introduction of the Gold Bill the average value of 100*l.* sterling, as we have seen, was 480 dollars; by the new standard, the quantity of gold contained in 100*l.* is now coined into 487 dollars, being a difference of 1·45 or nearly 1¼ per cent. Thus the par between England and America is now 487 d. = 100*l.*, or adhering to the old (erroneously assumed) par, a nominal premium of 9·45 per cent.

2. *Paper Money.* One of the evils to which paper money is liable is depreciation from excess. The market price of money, like that of every thing else, varies in the inverse ratio of its quantity. If it be scarce it will be dear; in other words, all other things will be cheap. If, on the other hand, money be in excess, it will be cheap; in other words, much of it will be given in exchange for other things. To say that prices are advancing, is equivalent to saying that money is getting cheaper and cheaper. The effect of issuing paper money in excess is, then, to make money, both metallic and paper, cheap. Being cheap, it becomes desirable to export it; but paper money is not available for this purpose, and hence metallic money is alone exported. Bullion in the uncoined state would, under such circumstances, advance in price, but the sovereign would be still a sovereign; hence there would exist a motive to convert coined money into bullion, or to export it. Bullion however would not be exported, except when it was really cheaper than in other countries.

During the Bank restriction the depreciation reached 27·9 per cent. Gold was then worth 5*l.* 8*s.* per ounce, and silver 6*s.* 11*d.* estimated in paper money. But at these nominally high prices the proportion between gold and silver was precisely the present average proportion, namely, 1 to 15·52; or, gold at 3*l.* 17*s.* 10½*d.*, and silver at 4*s.* 11¼*d.* The Parisian par was then 18·43 f. per 1*l.* sterling (instead of 25·58 f.), so that although *coin* might be sent away as a cheaper mode of conversion than melting, bullion would not necessarily be an article of export, unless when exchange was really, and not merely nominally, against us.

We have seen that the present average value of the dollar is 4*s.* 2*d.*; when silver was at 6*s.* 11*d.* the value would be 5*s.* 9¼*d.* in the depreciated English money. Hence a debt in London of 100*l.* could be discharged with 346 dollars 18 cents, whereas now it would require 480 dollars. The dollars remained unchanged, but 100*l.* of 1813 was worth only 72*l.* 2*s.* in gold.

As the par of 4*s.* 6*d.* was then, as now, retained, the depreciation was met by a heavy nominal discount of 27$\frac{9}{10}$ per cent. It is unnecessary to pursue these calculations to other countries: the same principles apply to all countries.

It is scarcely necessary to observe, that in the process of restoration the phenomena are reversed. A restoration of the English currency, for instance, would be similar in its effects to a depreciation of the currencies of all other countries.

3. *Clipping the Coin.* In some countries the practice of clipping the coin still continues, and it is likely to continue just so long as people will take clipped coin. If people would take shillings clipped into polygons, they would be so clipped in less than twenty-four hours.

The effect of clipping on the exchange is precisely similar to the two cases we have already examined. If the silver coin of France were clipped to the extent of one-tenth of its weight, exchange would be affected to that extent. Instead of requiring only 25·58 f. to purchase 1*l.* sterling on the Parisian Bourse, it would require 28·14 f. Restoration would be equivalent to clipping the coins of other countries.

Some of the continental states in which clipped coin circulates have adopted an expedient to keep up the character of their money of account. This expedient is to transact all their dealings with other nations in what they call *Banco*, which may be defined money *as it ought to be*, to distinguish it from the current or clipped money, which may be called *money as it is.* The merchants keep their bank accounts in *money as it ought to be*, paying in the clipped money, or *money as it is.* They are charged with the depreciation, which is known by the term *Agio.* This is purely an arrangement of convenience.

4. *Wear of Coin.* The case of a worn coinage is precisely similar to that of a clipped coinage, except that the latter is sudden in its effects, the former gradual. Hence depreciation from wear is much more likely to deceive than that which arises from clipping. Restoration by means of a new issue reverses all the effects.

We have now enumerated the principal circumstances affecting the value of a currency. Fluctuations in the rate of exchange proceeding from an alteration of the value of the medium in which price is quoted are purely *nominal;* and so they are usually designated. They are alterations proceeding from the altered quantity of the article purchased, and are analogous to an alteration of the price of wheat from an alteration in the capacity of the imperial quarter.

What is usually called the *real* exchange is the actual market-price, determined by the same law as the price of

sugar, corn, or broad-cloth: namely, the existing proportion between supply and demand.

The demand for bills of exchange arises out of the necessity of paying for importations. The supply arises out of the practice of drawing for the amount of exportations. If the supply and demand be equal—if for every pound's worth of goods imported there be exactly a pound's worth of exported goods to be drawn for—there will be no real exchange: that is, the real exchange, however much the nominal exchange may alter, will be at par.

When, however, the importations are not precisely equal to the exportations, exchange can no longer remain at par. An excess of importation would cause exchange to advance against the importing country. Let us suppose a case. Let us suppose that an actual or anticipated advance in the price of wheat causes the transmission of extensive orders to the north of Europe. This would produce a sudden demand for bills of exchange—not perhaps to the extent of the orders; for in all probability goods adapted to the markets of the wheat-growing countries would be sent in part payment—but, at all events, to a considerable amount. There would accordingly be an advance in the rate of exchange, first on the wheat-shipping ports, and next on all other countries. Thus, England imports wheat from Danzig, and exchange on Danzig rises. But exchange on Amsterdam is at par, as it is also at Amsterdam on Danzig. Hence the wheat-importer would buy a bill on Amsterdam, and with the proceeds would there buy a bill on Danzig. But the buyer of exchange on Amsterdam cannot go into the market without causing an advance in the rate. In this way the advance becomes general.

The real exchange, however, is subject to a limit beyond which it cannot advance. This limit is the cost of transmitting the precious metals. A debtor to a foreign country—say the importer of wheat—can liquidate his debt by the transmission of bullion as well as of a bill of exchange; and he will be determined in his choice by the comparative cheapness of either mode. The cost of transmitting specie is, let us assume, 2 per cent.: so long as exchange continues below 2 per cent. the debtor will continue to purchase it; but the moment the drawer demands more than that rate, the exportation of bullion will be resorted to, and bills of exchange will cease to be demanded. The cost of transmitting bullion, including the cost of collecting it at the port of shipment, is therefore the limit beyond which the real exchange cannot advance.

But an advance in the rate of exchange, even up to this point, cannot long be maintained. The tendency in an advance in the rate is to check importation and stimulate exportation. Articles which would only just pay with exchange at par would pay a profit sufficient to induce exportation where the exporter could secure 1 or 2 per cent. more for his draft. Thus, by the stimulus to exportation, the supply of bills would be increased to meet the demand, and *pro tanto* to check the advancing rate of exchange. On the other hand, an imported article which was only just paying when exchange was at par would cease to pay when it should cost the importer 2 per cent. more to make his remittance. Thus, whilst the cost of exporting the precious metals is the immediate check upon an advancing rate of exchange, the effect of the real exchange in stimulating or checking importation or exportation, as the case may be, is to work its own remedy. The real exchange is, in fact, continually gravitating towards par, though at times superior forces may overcome that perpetual tendency.

Most of the errors which prevail in relation to the subject of exchange arise out of confounding the real with the nominal exchange. For the purposes of general reasoning, it is well to know what is the average value of the currencies of the several nations with which we have commercial relations; but for practical purposes the actual par for the moment should be rigidly calculated. Unless this be done, the practical merchant will be liable to continual error. For farther information on the subject, the reader may consult Mill's *Elements of Political Economy*, chap. iii., sec. 16, p. 182; Ricardo's *Principles*, chap. vii., *On Foreign Trade;* article *Exchange* in the *Encyclopædia Britannica;* and Tooke's *High and Low Prices*, passim.

EXCHANGE, ROYAL. [GRESHAM.]

EXCHEQUER COURT is a superior court of record established by William the Conqueror as part of the Aula Regis, and reduced to its present order by Edward I.

It is the lowest in rank of the four great courts which sit at Westminster Hall, although in ancient times one of the first in importance, as all causes relating to the rights of the crown were there heard and determined, and the revenues of the crown were supposed to be received there. Perhaps the inferiority in point of precedence of this court may be attributed to its having been originally erected solely for the king's profit, which was considered an object inferior to the general administration of justice to the subject.

Etymologists have exhausted much research in ascertaining the origin of the name: some assert that it is derived from the old French word *Eschequier*, a kind of abacus or table; or the German, *Schatz*, 'treasure.' The Latinized form of the word is *Scaccarium*. Camden says it was so called from the covering of the table at which the barons sat being party-coloured or *chequered*, and on which, when certain of the king's accounts were made up, the sums were marked and scored with counters.

The judges of the court of exchequer are the chancellor of the exchequer for the time being, the chief baron, and four other barons, who are created by letters patent, and are so called from their having been formerly chosen from such as were barons of the kingdom, or parliamentary barons. (Selden's *Titles of Honour*.)

The court of exchequer was formerly held in the king's palace. Its treasury was the great deposit of records from the other courts; writs of summons to assemble the parliaments were issued by its officers; and its acts and decrees, as they related almost entirely to matters connected with the king's revenue, were not controlled by any other of the king's ordinary courts of justice.

It now consists of two divisions, one of which exercises jurisdiction in all cases relating to the customs and excise, and over revenue matters generally. The other division is subdivided into a court of common law, in which all personal actions may be brought, and a court of equity, where suits in equity may be commenced and prosecuted.

A plaintiff, when bringing an action in this court, previously to the Act for Uniformity of Process in personal actions (2 Will. IV. cap. 39), fictitiously alleged himself to be the king's debtor, in order to give the court jurisdiction in the cause; but since the passing of that act it is no longer necessary to resort to this fiction in order to bring an action on the plea side of the court of exchequer, as that statute assimilates the practice of all the common law courts, and the operation as well as the name of the processes issued from them are the same.

The number of officers on the plea side of the court of exchequer, and their several duties, are regulated by the 2nd and 3rd Will. IV. cap. 110. By 3rd and 4th Will. IV. cap. 70, a great number of old offices are abolished.

When the court sits in equity the chancellor of the exchequer has a voice (although now very rarely exercised) in giving judgment. The last case in which the chancellor was required to sit, owing to the barons being equally divided in opinion, was that of Naish against the East India Company, Michaelmas Term, 1735, when Sir Robert Walpole was chancellor, and his decision in a question of very considerable difficulty was said to have given great satisfaction.

An appeal lies from this court by writ of error to the justices of the courts of king's bench and common pleas sitting in the exchequer chamber, who alone have power to review the judgments of the barons; and from their decision a further appeal may be brought before the house of lords.

The Court of Exchequer chamber was first erected in England by stat. 31 Edward III., to determine causes upon writs of error from the common law side of the court of exchequer. The judges of the three superior courts occasionally sit here to hear arguments in important criminal cases, and upon causes of great weight and difficulty, in which the judges of the court below have not given their judgment.

As a court of error, the court of exchequer chamber underwent considerable alterations by the passing of the 11th Geo. IV. and 1st Will. IV. cap. 70., and its constitution is now regulated by that statute. [COURTS.]

The Court of Exchequer in Scotland was established by the 6th Ann, cap. 26. The judges are the high treasurer of Great Britain, with a chief baron, and four other barons.

By a recent act (3 and 4 William IV. c. 13) the powers

of the barons of the Scotch Exchequer as to the duties and revenues, &c., mentioned in the act have ceased, and are vested in the Commissioners of the Treasury; and the collection and management of the assessed taxes and land-tax of Scotland are transferred to the Commissioners for the Affairs of Taxes, but the judicial powers of the barons are specially saved.

The Court of Exchequer in Ireland was established by the 40th Geo. III. cap. 39, and consists of the chief justices, chief baron, and the rest of the justices and barons, or any nine of them.

EXCHEQUER BILLS form the principal part of the unfunded public debt of this country. These bills are issued under the authority of parliament for sums varying from 100*l.* to 1000*l.*, and bear interest. They were first issued in the reign of William III.; and although their amount has since varied greatly at different times, the convenience which they afford to individuals and their advantage to the public have been such as to cause their constant issue. Their convenience to individuals arises from the circumstance of their passing from hand to hand without the necessity of making a formal transfer, of their bearing interest, and of their not being subject to such violent fluctuations as sometimes occur in the prices of the funded debt. This comparative steadiness in value is caused by the option periodically given to the holders to be paid their amount at par, or to exchange them for new bills to which the same advantage is extended; besides this, when a certain limited period has elapsed from the date of their first issue, they may be paid to the government at par in discharge of duties and taxes. The amount of premium that may have been paid at the time of purchase is consequently all that the holder of an exchequer bill risks in return for the interest which accrues during the time that it remains in his possession. The advantage to the public consists in the lower rate of interest which they carry compared with the permanent or funded debt of the nation, to which, however, they must in this respect bear some certain proportion. When the price of the public funds is high, the interest upon exchequer bills will be low; and if, through any public or commercial derangement, the funds should fall in price so as to afford a much more profitable investment than exchequer bills, the rate of interest upon these must be raised in order to prevent their payment into the exchequer in discharge of duties: a thing which would embarrass the financial operations of government. When first issued in the reign of William III., the interest borne by exchequer bills was 5*d.* per 100*l.* per diem, being at the rate of 7*l.* 12*s.* 1*d.* per cent. per annum. In the same reign the interest was afterwards lowered to 4*d.* per 100*l.* per diem, or 6*l.* 1*s.* 8*d.* per cent. per annum; and in the following reign the rate was still farther reduced to 2*d.* per diem, or 3*l.* 0*s.* 10*d.* per cent. per annum. During the greater part of the war from 1793 to 1814, the rate of interest upon these securities was fixed at 3½*d.* per cent. per diem, or 5*l.* 6*s.* 5½*d.* per cent. per annum. Since the last-mentioned year the rate has been progressively reduced to 2½*d.*, 2*d.*, and 1½*d.* per 100*l.* per diem, at which latter rate they were in the market at the time of the derangement of the currency which was experienced in the beginning of 1837. Under these circumstances, it was considered important as far as possible to relieve the Bank of England, by which establishment a very large proportion of these securities were then held, and to place it in the most favourable position for affording relief to the commercial classes; and accordingly the rate of interest upon exchequer bills was raised to 2¼*d.* per cent. per diem, at which rate they are still current (August, 1837), although the high premium which they bear in the market—48*s.* per cent.—leads to the supposition that it will be soon again reduced.

In periods of commercial pressure, arising from causes which are believed to be temporary, it has sometimes been considered advisable by parliament to make advances to merchants upon the security of goods; these advances have been made by the issue of exchequer bills, which have been cancelled when the exigency that called for them has passed away. A more permanent occasion for their issue, apart from the immediate wants of the government, has been the desire of aiding individuals or private associations in the prosecution of works of public utility, such as canals, roads, &c. In these cases the rate of interest charged to the borrowers is somewhat greater than that borne by the bills, and the difference has been applied to defray the expense of management on the part of the public.

The amount of exchequer bills 'outstanding and unprovided for' at the end of each of the last ten years was as follows:—

	£.		£.
1827	27,546,850	1832	25,696,000
1828	27,657,000	1833	28,384,700
1829	25,490,550	1834	28,521,550
1830	25,609,650	1835	29,007,950
1831	25,551,350	1836	28,155,150

EXCISE DUTIES, the name given to taxes or duties levied upon articles of consumption which are produced within the kingdom. This description, which has usually been given of excise duties, is more strictly applicable now than it was formerly, when the commissioners of excise revenue were also charged with the collection of duties upon various articles imported from foreign countries. Among these foreign articles were wine, spirits, tobacco, glass, and tea. The last named of these was the last that was withdrawn from the management of the Excise and transferred to the Board of Customs. There are still, it is true, certain duties to which the name of excise is applied which can hardly be called duties upon consumption, although they are accessary to it, such as the duty on sales by auction and the sums charged for licenses to permit parties to carry on certain trades.

Excise duties are said to have had their origin in this country in the reign of Charles I., when a tax was laid upon beer, cider, and perry, of home production. The act by which these duties were authorised was passed by the long parliament in 1643. This act contains also a list of foreign articles, and among others tobacco, wine, raisins, currants, and loaf sugar, upon which excise duties were imposed in addition to duties of customs already chargeable. This act was adopted and enforced under the protectorate of Oliver Cromwell; and by the statute 12 Charles II. c. 24, the duties of excise were granted as a part of the revenue of the crown.

For a long time this class of duties was viewed with particular dislike by the people, on account of its inquisitorial interference with various industrial pursuits, and it certainly forms a very strong ground of objection against excise duties, that the security of the revenue which they yield is held to be incompatible with the perfect freedom of the manufacturer as to the processes which he may apply in his works. In every highly-taxed country where consumption duties form part of the public revenue it would seem however to be hardly possible to avoid the adoption of this class of duties. If, taking for our example an instance which is now exercising an injurious effect in a neighbouring country, it is found expedient to impose a customs' duty upon the consumption of foreign-made sugar, it is clearly necessary for the protection of the revenue that an excise duty should be imposed upon sugar of domestic production, otherwise the community at large is made to bear the load twice, once in the form of some other tax, and again to the producer of indigenous sugar, who will charge the consumer nearly as much as he would pay to the importer of foreign sugar, including the amount of the duty. By such means a branch of industry would be fostered, unprofitable to the country at large, and profitable only to the few persons by whom the indigenous sugar is produced, but whose profits will not long continue greater than the usual profits upon the employment of stock obtainable in the same country from other branches of industry. An attempt has been lately made to set up a beet-root sugar manufactory in England but parliament having imposed an excise duty upon the produce equal to the customs duty charged upon colonial sugar, it does not appear probable that the attempt can be successful, or indeed that it can be persevered in, which indeed is little to be regretted, for the reason already assigned.

Excise duties are liable to this among other very serious objections, that the regulations under which they are collected are made, perhaps unavoidably, to interfere with processes of manufacture, so as to prevent the adoption of improvements which would be beneficial first to the manufacturer and afterwards to the community at large, which must always be interested in their adoption, because of the greater excellence or cheapness of the products which it is the object of the experimenter to attain. It will give some idea of the

extent to which this interference is injurious, if we state, on the authority of a gentleman conversant with all the details of the art of calico-printing, that upon the same premises, with the same capital, and employing the same amount of labour, double the quantity of cloths are now printed which could have been printed previous to the repeal of the duty, and to the consequent withdrawal of the excise-officers from the works. Another great objection that may be urged against excise duties is, the facilities which they offer for the commission of frauds against the revenue, an offence which, in the eyes of many persons, is of a venial kind, but which too often ultimately demoralizes those by whom it is committed. In the Seventeenth Report of the Commissioners appointed to inquire into the management and collection of the excise revenue it is stated as a striking proof of the extent to which frauds are committed by manufacturers of soap, that 'there are in England fifty that take out licenses, for which they pay 4*l.* per annum, each of which makes, or rather brings to charge, less than one ton of soap per annum, from which it is obvious that as the profits of such a sale would not pay for the license, the entry is made in order to cover smuggling.' With regard to malt, another article of great consumption which is subject to excise duties, the commissioners state it to be their opinion, founded upon the evidence given by several respectable maltsters, 'that malt is sold throughout the season, and in large quantities, for a price that is insufficient to pay the expense of making it and duty; and that the duty is evaded to a great amount.' A strong presumptive evidence to this effect is contained in the fact that the average number of bushels of malt brought to charge in each of the ten years from 1725 to 1734 was 26,177,330, while in the ten years from 1825 to 1834, that is, after the lapse of a century, the number of bushels so brought to charge was 29,572,380; although during that time the population had been more than doubled, and the habits of the people not altered in any way that should lead to the supposition of any decreased consumption of the products of malt.

The articles now subject to excise duty are:—auctions; bricks; glass; hops; licenses; malt; paper; soap; spirits (British); vinegar.

In addition to the foregoing, excise duties were collected in 1797, under the following nineteen heads, viz.; * starch; * stone bottles; * sweets and mead; tea; * tiles; * candles; * coaches; cocoa; coffee; * cider; * perry; * hides and skins; pepper; * printed goods; * salt; spirits (foreign); tobacco and snuff; wine; * wire.

Of these nineteen articles the duties have been repealed upon the twelve to which an asterisk is prefixed; the collection of duties on the remaining seven articles has been transferred to the Customs department.

The following table states the amount of payments made into the Exchequer on account of excise duties in England, the charges of collection and the rate per cent. on the collection calculated on the gross revenue in each year from 1797 to 1835.

	Net Receipt. £	Charges of Collection. £	Rate per cent. £	s.	d.
1797	9,452,887	411,696	3	14	4¼
1798	9,872,025	409,357	3	10	11¾
1799	11,429,523	425,174	3	3	7¾
1800	10,198,749	432,329	3	12	1
1801	10,529,110	557,766	4	9	2
1802	13,774,158	520,022	3	7	0½
1803	16,889,374	525,683	2	17	9¼
1804	19,[illegible]48,143	557,470	2	13	1½
1805	21,015,539	564,594	2	10	0
1806	21,739,067	579,940	2	9	6½
1807	22,087,226	648,756	2	14	6
1808	22,933,712	694,883	2	16	5½
1809	21,273,197	701,990	3	0	1¼
1810	23,382,772	737,043	2	18	0
1811	23,384,554	802,261	3	3	11¾
1812	20,961,813	826,493	3	12	7
1813	22,877,737	830,621	3	5	11¾
1814	23,649,676	860,787	3	4	0
1815	24,796,633	885,169	3	4	8¾
1816	21,553,638	928,659	3	13	2
1817	18,396,400	992,744	4	15	10½
1818	21,330,746	953,869	3	19	7½
1819	21,492,839	951,431	3	19	10½
1820	24,742,242	958,124	3	10	7¾
1821	24,781,957	964,515	3	10	4¾
1822	24,022,441	950,644	3	10	7
1823	22,375,780	933,815	3	13	9½
1824	23,498,903	923,864	3	10	0¾
1825	18,055,446	889,994	4	1	8
1826	16,158,649	857,310	4	12	10
1827	15,446,801	846,591	4	13	5¾
1828	16,718,861	829,162	4	4	10¾
1829	15,761,547	822,070	4	10	1¼
1830	14,747,976	840,101	4	16	5¼
1831	12,411,676	797,298	5	11	3¾
1832	12,909,188	762,863	5	6	2
1833	12,846,800	750,982	5	5	1½
1834	11,061,893	748,724	6	1	8
1835	9,518,688	738,812	6	16	0

The gross and net receipt, charges of management, and the rate per cent. for which the gross revenue of excise in England, Scotland, and Ireland respectively, were collected, for the year 1835, were as follows:—

	Gross Receipt. £	Net Receipt. £	Charges of Management. £	Rate per cent. for which the Revenue was collected. £	s.	d.
England	10,861,182	10,255,486	738,812	6	16	0
Scotland	2,456,705	2,232,961	150,530	6	2	6
Ireland	1,911,464	1,906,150	183,049	9	11	6

The gross receipt, as stated in the foregoing abstract, was collected on the different articles subject to excise-duties in the following proportions:—

	England. £.	s.	d.	Scotland. £.	s.	d.	Ireland. £.	s.	d.	United Kingdom. £.	s.	d.
Auctions	215,171	2	0	19,766	17	11½	10,838	11	8½	245,776	11	7½
Bricks	395,080	7	8¾	8,945	11	7½	..			404,025	19	4¼
Glass	921,544	7	10½	39,554	4	2	16,630	0	7½	977,728	12	7¾
Hops	333,856	3	6	..			..			333,856	3	6
Licenses	847,259	8	11¾	124,564	12	0	146,212	17	3¼	1,118,036	18	3¼
Malt	4,321,456	14	2½	548,147	10	6¼	260,294	13	11¼	5,129,898	[illegible]	8
Paper	742,101	13	3¼	126,915	18	9½	33,321	19	4¾	902,339	11	5¼
Soap	891,647	6	7¾	82,451	11	9½	..			974,098	18	5¼
Spirits	2,155,531	9	4½	1,467,514	15	3	1,436,191	7	5	5,059,237	12	0¼
Tea	59	12	7¼	..			..			59	12	7¼
Vinegar	25,871	0	8¼	222	15	8	408	8	8	26,502	5	0½
	10,849,579	6	10	2,418,083	17	9½	1,903,897	19	0½	15,171,561	3	7½
Late collector's balances	..			..			918	12	0	918	12	0
Law-costs recovered	876	11	4¾	215	0	8¼	1,811	11	8½	2,903	3	9½
Fines and forfeitures	10,726	4	11¼	2,027	0	11½	4,836	5	6½	17,589	11	6
Produce of stock, &c. belonging to the late Scotch Excise Incorporation Fund	..			36,379	4	9	..			36,379	4	9
Total	10,861,182	3	2½	2,456,705	4	2¼	1,911,464	8	3¾	15,229,351	15	8¼

The estimated amount of excise duties repealed since 1824 is 6,782,000*l.*, and the amount of those, the management of which has been transferred to the Customs, is 11,238,300*l.* The rates of excise duties at present chargeable in England, Scotland, and Ireland respectively, are as follows:—

	England.	Scotland.	Ireland.
Auctions.—On estates, houses, annuities, shops, plate, jewels, &c.	7d. in the £	7d. in the £.	6d. in the £.
On household furniture, horses, carriages, and other goods and chattels	1s. in the £.	1s.	10d.
On sheeps' wool	2d. in the £.	2d.	2d.
On foreign produce, the 1st sale thereof	¼ per cent.	¼ per cent.	¼ per cent.
Bricks.—Common	5s. 10d. per 1000	5s. 10d. per 1000	
Large	10s.	10s	
Polished	12s 10d.	12s. 10d.	
Extra polished	2s. 5d per 100	2s. 5d.	
Extra large polished	4s. 10d.	4s. 10d.	
Glass.—Flint, fluxed materials	3½–4½d. per lb.	3½–4½d. per lb.	2½d. per lb.
Plate	60s. per cwt.	60s. per cwt.	
Crown	£3 13 6 ditto	73s. 6d.	
Broad glass	£1 10 0 ditto	30s.	
Bottle	7s ditto	7s.	7s.
Hops	2d per lb.		
Malt	2s. 7d. pr. bus.	2s. 7d. pr. bus	2s. 7d. per bus.
Paper.—Writing, drawing, printing, elephant, cartridge, and all other kinds, mill-bds., &c.	1½d. per lb.	1½d. per lb.	1½d. per lb.
Soap.—Hard	1½d. per lb.	1½d. per lb.	
Soft	1d.	1d.	
Spirits (British)	7s. 6d. pr. gal.	3s. 4d. pr. gal	3s. 4d. pr. gal.
Vinegar	2d. per gal.	2d. per gal.	2d. per gal.

The number of traders who were obliged to take out excise licenses in 1835, or whose premises were subject to visits from the excise officers, in England, Scotland, and Ireland respectively, was—

	England.	Scotland.	Ireland.
Brewers of beer for sale, viz.—			
Common brewers	1,918	216	232
Retail brewers	23	22	..
Brewing victuallers	25,456	323	4
Other brewers	14,521	..	..
Total number of brewers	41,918	561	236
Maltsters	12,695	1,171	388
Soap-makers	263	39	..
Brick-makers	5,711	127	..
Paper-makers	442	49	57
——— stainers	94	1	45
Pasteboard-makers	56	1	..
Glass-makers	116	13	6
Distillers	13	248	95
Vinegar-makers	39	5	5
——— rectifiers	2	..	..
Pyroligneous acid makers	28	1	2
Rectifiers	105	8	19
Tobacco and snuff manufacturers	303	151	291
Tallow-melters	2,737	188	..
Glass-pinchers	56	..	..
Malt-roasters	20	1	3
Crude pyroligneous acid makers	24	5	..
Soap-claimants	2,374	327	..
Snuff-mills	3	4	..
Card makers	6	..	..
University printers	3	2	2
Iron liquor maker	1	..	..
Spirit-grocers	..	..	45
Dealers in brandy	2,082	58	98
——— wine	1,812	34	218
——— tea	79,181	13,590	12,203
——— tobacco	148,850	13,027	11,989
——— vinegar	77,539	2,351	3,593
Spirit-dealers who have also retail licenses	1,094	511	318
Retailers of spirits	47,384	16,391	18,957
——— wine	18,701	2,527	2,772
——— sweets	556	29	48
Beer-dealers	905	30	33
Retailers of beer, cider, &c. not to be drunk on the premises	35,731	22	..
Corn-mills	..	..	1,822
—— kilns	..	..	2,796

The management of a branch of the revenue which is collected in every part of the kingdom necessarily gives employment to a great number of officers. The numbers so employed in England, Scotland, and Ireland, and the amount of their salaries at different periods, were as follows:—

Years.	England.		Scotland.		Ireland.		Total.	
	No.	Salaries.	No.	Salaries.	No.	Salaries.	No.	Salaries.
		£.		£.		£.		£.
1797	4,777	323,671	926	51,321	877	38,290	6,580	413,282
1805	5,067	422,878	1,160	71,234	875	38,705	7,102	532,817
1810	5,318	587,774	1,150	89,427	1,005	114,912	7,473	792,113
1815	5,509	630,786	1,054	110,494	1,076	127,402	7,639	868,612
1819	5,798	654,781	1,121	122,710	1,067	127,431	7,986	904,922
1827	4,790	594,196	1,004	99,560	700	80,044	6,494	773,800
1833	4,286	529,095	872	98,071	650	82,549	5,808	709,715

EXCITANTS. [STIMULANTS.]

EXCOMMUNICATION, from *Excommunicatio*, is the highest ecclesiastical censure which can be pronounced by a spiritual judge. The person against whom it is pronounced is for the time being excluded from the communion of the church. This punishment, as well as many others, springing from ecclesiastical jurisdiction, according to some opinions, had its origin in the advice given by St. Paul when reproving the early Christians for scandalizing their profession by prosecuting law-suits against each other before heathen judges; and the apostle accordingly recommended them to leave all matters in dispute between them to the decision of the Ecclesia, or the congregation of the faithful. This advice was soon followed, and heathen tribunals were seldom afterwards occupied by the controversies of the Christians.

The bishop and his clergy, and afterwards the bishop alone, became sole judge in these disputes; but possessing no coercive powers to enforce their decrees, they were obliged to adopt the only means of which they could avail themselves, to bring the refractory to submission, namely, by excluding them from the rites of the Church, and warning other Christians from their company and presence. A Christian thus shut out from the fellowship of his own brethren could not do otherwise than submit unconditionally.

This censure, although instituted by the primitive church as the means of preserving its purity, and of enforcing obedience to its just laws, was afterwards used for the promotion of ecclesiastical power, and was converted into an engine of the greatest oppression in those countries which were most subject to ecclesiastical rule. (Robertson's *History of Charles V.*, vol. ii. p. 109.)

In England excommunication became at a very early period the instrument of punishment under the authority of the bishops, and others possessing ecclesiastical jurisdiction. It was divided into the greater and the less excommunication. The latter only removed the person from a participation in the sacraments, and is what was most commonly meant by the term excommunication; the other was called anathema, and not only removed the party from the sacraments, but from the Church and all communication with the faithful, and even deprived him of Christian burial. Subjects were absolved from their allegiance to an excommunicated prince: indeed they were forbidden to obey him. Gregory V. was the first prelate who ventured to excommunicate a reigning prince in the case of Robert, king of France, in 998. John and Henry VIII. are well-known instances in English history. The latest instance of all was Napoleon, in 1809, by Pius VII.

Excommunication sometimes followed immediately upon the commission of an offence, and was then called canonical, to distinguish it from that which did not depend upon any established canon, but upon the sentence of a judge.

The following offenders were punished with the greater excommunication: diviners, heretics, their receivers and comforters; simoniacs; violators and plunderers of churches; those who spoiled clerks going to Rome; the plunderers of the property of a bishop which ought to go to his successor; those who gave aid, favour, or counsel to excommunicated persons; those who laid violent hands on clerks or religious persons, or commanded others to do so.

Those punished with the less excommunication were persons committing any mortal sin, as sacrilegious persons; those who received a church from lay hands; notorious offenders; those who talked with, saluted, or sat at the same table with, or gave anything in charity to persons excommunicated by the greater excommunication, unless they were familiars or domestics.

Excommunication was also pronounced for other matters which belong to ecclesiastical jurisdiction, as adultery, incontinence, fornication, &c., or for contempt of any ecclesiastical order or sentence. A sentence of excommunication was preceded by three monitions at due intervals, or one peremptory, containing the legal space of time, with a proper regard to the quality of the person and the nature of the offence. But, as Blackstone remarks, 'heavy as the penalty of excommunication is, considered in a serious light, there are, notwithstanding, many obstinate or profligate men, who would despise the *brutum fulmen* of mere ecclesiastical censures, especially when pronounced by a petty surrogate in the country, for railing or contumelious words, for non-payment of fees or costs or other trivial causes. The common law therefore compassionately steps in to the aid of the ecclesiastical jurisdiction, and kindly lends a supporting hand to an otherwise tottering authority.' This was effected by the writ 'de

excommunicato capiendo,' or for seizing the excommunicate. But before the writ for taking the excommunicated person could be granted the contumacy and contempt of the party were to be certified by the bishop to the court of Chancery by letters under his seal; and by 5 Eliz. c. 23, the writ was made returnable into the King's Bench. By the statute just cited the cause of excommunication was to be stated in the writ, in order that the court might judge as to the justice of the case. The sentence of excommunication might be revoked by the judge who passed the sentence, or upon appeal the party might be absolved. Absolution generally belonged to the same person who passed the sentence, unless in some particular cases, which were referred to the pope or a bishop. (Reeves' *Hist. of English Law;* Sullivan's *Lectures.*)

By a sentence of excommunication, both greater and less, those denounced were excluded from the right of Christian burial, from bringing or maintaining actions, from becoming attornies or jurymen, and were rendered incapable of becoming witnesses in any cause. But since the 53rd Geo. III. c. 127, excommunication cannot now be pronounced in England, except in certain cases (as spiritual censures for offences of ecclesiastical cognizance); and by the 3rd section of that statute 'no person who shall be pronounced or declared excommunicate (pursuant to the second clause of this statute) shall incur any civil penalty or incapacity, in consequence of such excommunication, save such imprisonment, not exceeding six months, as the court pronouncing or declaring such person excommunicate shall direct.' The proceedings in those cases, in which excommunication may still be pronounced, are the same, as to the issuing and return of the writ, as they were before the act of 53 George III. By the same act (53 George III. c. 127), in all cases cognizable by the laws of England in ecclesiastical courts, when any person shall refuse to appear when cited by such court, or shall refuse to obey the lawful order or decree of such court, no sentence of excommunication, except in the cases above alluded to, shall be pronounced; but a writ 'de contumace capiendo' shall issue, which in effect is the same as the old writ 'de excommunicato capiendo' was. Thus the various difficulties are now obviated which formerly existed in courts of law with respect to excommunication.

EXECUTION is the effect given to the judgments and other proceedings analogous to judgments of courts of law and in civil suits. This term denotes the process by which a party is put into the actual possession of that to which by the proceedings of a court he appears to be legally entitled.

As a judgment of a court of common law ascertains that the party is entitled to the possession of some subject of a real or personal nature; or to recover damages in respect of property withheld or injuries done, so the execution founded upon such judgment will be framed with a view to putting the party in whose favour the judgment is given either in the actual possession of the thing in dispute, or to enable him to obtain pecuniary compensation.

For this purpose a written command issues in the name of the king or other lord or owner of the court, to an officer of the court: when the judgment is in one of the king's superior courts at Westminster, the officer of the court for this purpose is the sheriff of the county in which the property is situate, or, in the case of pecuniary compensation, the sheriff of the county in which the party from whom such compensation is due is supposed to reside; which, until the contrary is shown, is taken to be the county in which the litigation was carried on.

Where lands or other corporeal hereditaments are recovered, the process of execution varies according to the nature of the interest recovered. If a right to a freehold interest has been established, the writ commands the sheriff to give the recoverer seisin of the lands, &c., and is called habere facias seisinam. [HABERE FACIAS SEISINAM.] If a chattel interest only is recovered, the writ does not affect to authorize the sheriff to intermeddle with the freehold, and directs that officer merely to give possession of the land, &c. This is called an habere facias possessionem. [HABERE FACIAS POSSESSIONEM.]

A judgment in the action of detinue [DETINUE] establishes the right of the recoverer to the possession of a specific personal chattel, and the writ of execution called a distringas ad deliberandum issues, requiring the sheriff to coerce the defendant by his distringas (distress) to restore the specific chattel or its value.

A judgment for the defendant in replevin [REPLEVIN] establishes his right to the possession of the personal chattel which formed the subject of the litigation. In the ordinary case of an action of replevin after a distress, the right of the defendant in respect of the chattel distrained is merely to hold it as a security for the payment of the debt or duty, the payment or performance of which is sought to be enforced by the coercion of a distress. [DISTRESS.] The writ of execution requires the sheriff to cause the chattel to be restored to the possession of the defendant. This is called a writ de retorno habendo, and in case the sheriff is unable to find the chattel, further process issues commanding him to take other chattels of the plaintiff as a substitute for that which is withheld, by a writ called a capias in withernam.

The most ordinary cases of execution are those in which pecuniary compensation is to be obtained, but in these cases the sheriff is not authorized directly to take money from the party by whom it is to be paid. Formerly the only mode of obtaining this compensation was by process of distringas or distress. And this is still the case in inferior courts; but in the superior courts execution of judgments or other records establishing pecuniary claims may be had by a writ of fieri facias [FIERI FACIAS] affecting the personal property; by writ of elegit [ELEGIT], affecting both real and personal property; and by capias ad satisfaciendum [CAPIAS], by which compliance with the pecuniary demand is enforced by detention of the person of the defaulter in prison until the claim be satisfied, or the adverse party consents to his discharge.

A subject is not entitled to pursue all these remedies at once; but in the case of the crown, the right to obtain satisfaction from the goods, lands, and person of its debtor may be enforced simultaneously, by writ of capias, and extendi facias, or extent. [EXTENT.]

EXECUTION is also the term applied to denote the giving effect to the sentence of a court of criminal jurisdiction. In this sense it is most commonly used with reference to the execution of sentence of death. [SHERIFF.]

EXECUTOR. An executor is he to whom another man commits by will the execution of that his last will and testament. He answers in some degree to the *hæres designatus*, or *testamentarius*, in the civil law, as to the debts, goods, and chattels of his testator; but the origin of executors seems to be properly traceable to a constitution of Manuel Comnenus (περὶ διοικητῶν τῶν διαθηκῶν). All persons who are capable of making a will, and some others besides, as married women and infants, are capable of being made executors; but infants are by statute rendered incapable of acting in the execution of the will until they attain the age of twenty-one.

An executor can derive his office from a testamentary appointment alone, though it is not necessary that he should be appointed by express terms; any words of the testator indicating an intention to make the appointment are sufficient: in this case he is usually called 'executor according to the tenor.' If no executor is appointed by the will, administration is granted by the ordinary, with the will annexed, in which case the administrator is bound to obey the directions given by the will. An executor may renounce probate; but having once acted, he cannot divest himself of the office or its liabilities; nor can an administrator who has accepted the office, get rid of his responsibility.

An executor may do many acts in execution of the will, even before probate, as paying and receiving debts, &c., but he cannot, before probate, sustain actions or suits. An administrator can do nothing till the letters of administration are issued; for the former derives his power from the will, and not from the probate: the latter owes his entirely to the appointment of the ordinary. If an executor die before probate, administration must be taken out to his testator, with the will annexed; but if an executor, having proved the will, die, his executor will be the executor and representative of the first testator, unless, before proving the will of the second testator, he expressly renounces the execution of the will of the first. If the executor dies intestate, his administrator is not the representative of the testator, but an administrator *de bonis non* of the testator must be appointed by the ordinary. If there are several executors, the office survives, and is transmitted ultimately to the executor of the surviving executor, unless he dies intestate. Executors have a joint and entire interest in the effects of their testator; any one of them is capable of acting by himself; and the receipt of a debt, or the transfer of property by one, is as valid as if it had been done by all.

If a stranger takes upon himself to act as executor without any authority, as by intermeddling with the goods of the deceased, he is called an executor *de son tort* (of his own wrong), and is liable to all the trouble of an executor without any of the advantages attached to the office. He is chargeable with the debts of the deceased, so far as assets come to his hands; and is liable not only to an action by the rightful executor or administrator, but also to be sued as executor of the deceased by his creditors and legatees. The only advantage which an executor derives from his office is the right to retain any debt due to him from the testator, as against creditors of equal degree, and this privilege is allowed him, because he cannot take any legal steps to recover payment. This, though practically a privilege, is in reality only a provision of the law that he shall not be prejudiced by his appointment; otherwise as a man cannot sue himself, all the other creditors would, by instituting a suit against the executor, gain priority over him in respect of their debts.

The duties of executors and administrators are in general the same, the only essential difference between them being, as before mentioned, the mode of their appointment. Their duties are to bury the deceased, to prove his will in the proper Ecclesiastical Court, to collect and get in his goods and chattels, to pay his debts in the order appointed by law, and also his legacies, if he has bequeathed any, and to dispose of the residue of his goods and chattels in the manner by the will directed, or according to the statutes for the distribution of the effects of intestates, if there should be a total or partial intestacy. Executors and administrators are liable to an action at law, and also to a suit in equity, for the payment of the debts and liabilities of their testator or intestate; and to a suit in equity and the Ecclesiastical Court for the legacies bequeathed by him, and the due administration of his estate: but no action at law lies for a legacy, at least not until after the executor has assented to it, as it is called, that is, has acknowledged the sufficiency of the assets after providing for the payment of the debts. [LEGACY.]

It appears to have been a subject of much controversy whether the probate of wills was originally a matter of exclusive ecclesiastical jurisdiction, but whatever may have been the case in earlier times, it is certain that at this day the Ecclesiastical Courts are the only courts in which, except by special prescription, the validity of wills of personalty can be established or disputed. If all the goods of the deceased lie in the diocese or jurisdiction within which he died, the probate is made before the bishop or ordinary of that diocese or jurisdiction; but if he had *bona notabilia* (that is, goods and chattels to the amount of 5*l*.) within some other diocese or jurisdiction than that in which he died, then the will must be proved before the archbishop or metropolitan of the province by special prerogative; and if there be *bona notabilia* in different provinces, there must be two prerogative probates. A will should be proved within six months after the death of the testator, or within two months after the termination of any dispute respecting the probate. (See 55 Geo. III. c. 184, sec. 57.)

Executors and administrators are treated by the courts of equity as trustees for the creditors, legatees, and next of kin of their testators or intestates. They are bound to administer the assets according to their due order of priority and to pay the debts of the deceased in like manner; and though the ecclesiastical courts will entertain suits for the payment of debts or legacies and the due administration of the assets, yet, where there is any trust to be executed, or any charge on real estate to be established, a court of equity will interfere by injunction or prohibition; for the constitution of the ecclesiastical courts is not adapted to the administration of trusts, and over real estate they have no jurisdiction. The probate is exclusive evidence of a will of personalty; but courts of equity assume the jurisdiction of construing the will in order to enforce the performance of the trusts by the executor: hence they are sometimes styled courts of construction, in contradistinction to the ecclesiastical courts, which, although they also are courts of construction, are the only courts of probate. Formerly, the personal estates only of persons deceased were liable for the payment of their simple contract debts; but now, since the statute 3 and 4 Wm. IV. c. 104, real estates are liable for the payment of debts of that nature; and it may be broadly stated that all the real and personal estates of the deceased are assets for the payment of his debts. The personal estate is liable in the first instance, unless the testator direct otherwise. Estates descended are applied before estates devised; and in other respects the estates of the deceased are administered in the order laid down by the courts.

The debts are also payable in a certain prescribed order. 1. The funeral expenses, the expenses of probate, and the costs of a suit for the administration of the estates, if any be instituted. 2. Debts due to the crown on record or specialty. 3. Certain debts, which by statute are to be preferred to others, as poor-rates, by stat. 17 Geo. II. c. 38, &c. 4. Debts of record, as judgments, statutes, and recognizances. 5. Specialty debts, *i. e.*, debts due on bonds or instruments under seal. 6. Simple contract debts, as upon bills of exchange and ordinary verbal engagements. It seems that in this class debts due to the crown and the wages of domestic servants are entitled to priority.

A mortgage made by the testator must, if there be no specified direction in his will, be paid out of the personal assets, if there be sufficient to pay the other creditors and legatees; it is, in fact, considered as the personal debt of the testator: though, if he did not create the mortgage himself, but took the estate subject to the mortgage by purchase, inheritance, or devise, the debt, not being his personal engagement, must be borne by the estate itself. The executor must pay the debts in the order mentioned; for if he apply the assets in payment of those of a lower degree, he will be personally answerable, to the extent of the assets misapplied, to the creditor of the higher degree. He may, however, pay a debt of an inferior degree before one of a superior, provided he has no notice of the latter and a reasonable time has elapsed after the testator's death; except in the case of debts of record due to the crown, of which the executor is bound to take notice. An executor or administrator may also retain his own debt as against creditors of an equal degree; and he may pay any one or more debts to creditors of equal degree, although thereby he may exhaust the assets, unless a suit or action be commenced against him; and even in that case he may, by confessing a judgment, enable a creditor to obtain priority. But notwithstanding an action or suit be commenced, he may pay a creditor of a higher degree than the one proceeding against him; save only where the suit is for a general administration of the estate, when the executor should not make any farther payments.

The debts being all paid, the next duty of an executor or administrator is to pay the legacies, and distribute the personal estate to the next of kin of the testator if there be any overplus; but where the testator has made a residuary legatee, he is entitled to the surplus. If the assets are not sufficient for the payment of the legacies, the executor must pay to each legatee an equal proportion of his legacy, unless the testator has directed the order of payment, in which case the legacies must be paid in full in the prescribed order, and the whole loss must fall upon the last in order. Specific legatees, *i. e.* persons to whom a specific fund or article of property is given by the will, are not liable to abatement of their legacies, but receive the fund or article whether the assets are or are not sufficient to pay the other legatees; though if the fund is changed, or the article sold, or from any other cause is not in existence at the death of the testator, the legacy fails, or in technical language, is said to be adeemed. Executors and administrators cannot be compelled to pay legacies or distribute the personal estate before the expiration of a year after the decease of the testator; and not even then, if notice has been acquired or there is reasonable ground to suspect the existence of debts and liabilities. Indeed, unless the assets are of ample amount, the executor or administrator should not pay within the year, even though the testator has directed it to be done; for it has been held that such a payment affords no defence against a creditor, and the testator or intestate may be bound by covenants upon which subsequent liabilities may accrue; or he may have been a trustee, and some maladministration of the trust estate may be discovered after the lapse of many years. In these and many other cases, executors and administrators should not part with the assets until all chance of liability is at an end, or security be given by the parties receiving them to refund in case of need. This last course will sometimes be directed by a court of equity in a suit for a legacy; for though an executor or administrator may recover from the legatees or next of kin to whom he has handed over the assets in

case of subsequently-discovered debts of the deceased, it is obvious that this is a very insufficient and uncertain security. Where a legatee is an infant, or the testator has directed his executors to invest any portion of his estate in the funds, or has provided for some future payment to be made, or from any other cause, an investment by the executors becomes necessary, they are, in the absence of any express direction to the contrary, bound to make such investment in the Three per Cent. Consols, that fund being considered by the Court of Chancery as the most desirable for the purpose of investment. The rule is inflexible, and an executor who should disregard it would run great risk of having to pay the costs of a suit to compel him to place the money in that fund, and to make good any loss which might occur through the change of securities.

Full information upon these subjects will be found in the works of Williams, and Toller 'On Executors,' and Wentworth 'On Administrators.'

EXE'DRA (ἐξέδρα), a name given to certain open recesses in the buildings of the antients. There were numerous exedræ in the baths. Vitruvius says the spacious exedræ of the Greek palæstra were furnished with seats. The exedræ were placed in the three porticos of the palæstra. (Vitruvius, v. c. 9.) Sometimes in houses a covered hall, and of a square form, was called exedra. (Vitruvius, vi. cap. 5.) In the disposition of the Greek house the exedræ were placed looking to the west. (Vitruv. vi. cap. x.)

EXERCISE. [ANALEPTICS.]

EXETER, a city and a county of itself, locally in the hundred of Wonford, in the southern division of the county of Devon, of which it is the chief town; 44 miles northeast from Plymouth, and 174 west by south from London.

Exeter is supposed to have been a settlement of the Britons before the Roman invasion. It was then called 'Caer-Isc' and 'Caer Rydh,' the former derived from its situation on the Ex or Isc, the latter from the red soil on which the castle is built. By the Romans it was called Isca Dumnoniorum, to distinguish it from the Isca Silurum in Wales. From the number of coins, small bronze statues (evidently Penates), tesselated pavements, and other Roman antiquities discovered near the walls and in the neighbourhood of the city, it must have been a Roman station of some importance. It is uncertain how long Exeter retained its appellation of Isca Dumnoniorum, but in the reign of Alfred it had acquired that of Exan-Cestre (castle on the Ex), whence its present name.

In the reign of King Stephen, Baldwin Rivers, earl of Devon, fortified Exeter on behalf of the Empress Maude, and did not yield till reduced by famine after a long siege. It was besieged in the 12th year of the reign of Henry VII. by Perkin Warbeck, and again by the rabble of Devonshire and Cornwall in 1549.

The city of Exeter was formerly surrounded by walls and strongly fortified. Leland, in speaking of it, says, 'The toune is a good mile and more in cumpace, and is right strongly waullid and maintained. Ther be diverse fare towers in the toune waul bytwixt the south and west gate. There be four gates in the toune, by names of Est, West, North, and South. The Est and the West Gates be now the fairest, and of one fascion of building: the South Gate hath been the strongest.' Situated on a high eminence, on the north side of the town, are the ruins of the castle, called 'Rougemont.' When this castle was first erected is unknown; but it was either rebuilt or much repaired by William the Conqueror, who bestowed it on Baldwin de Briono, husband of Albrina his niece, in the possession of whose descendants it remained till the 14th year of the reign of Henry III., who then took it into his own hands. It was completely dismantled during the civil war, and has never since been rebuilt. In the area of the castle-yard a session-house has lately been erected, which is a neat-looking building, faced with Portland stone, and contains, in addition to two good-sized courts, a grand-jury room, magistrates' room, &c. In front is a fine open space, where county, election, and other meetings are held. To the north of the castle is a delightful walk, shaded by fine old elm trees, called Northernay. Nearly in the centre of Exeter is the guildhall, where the assizes for the city (which is a county of itself) are held, as well as the sessions, elections, and other business relative to the city alone. The building contains several valuable portraits, amongst others, those of Henrietta Maria, Charles the First's queen, of her daughter Henrietta duchess of Orleans, and of General Monk. The only other antient building of any importance at Exeter is the cathedral. It is uncertain when the present edifice was begun, but probably it was soon after the see of Devon was transferred to Exeter from Crediton, which was its locality till the year 1049. At all events it was considerably altered and enlarged by Warlewast, third bishop of Exeter, who was a Norman, and came over with the Conqueror. It then assumed its present cruciform shape, but underwent numberless alterations and additions during the thirteenth and fourteenth centuries. It now consists of a nave, 76 feet in width and 175 in length, with aisles on each side; two short transepts, formed by two Norman towers 130 feet in height; a choir of the same width as the nave, and 128 feet in length; ten chapels or oratories, and a chapter-house. The whole building from east to west (including St. Mary's Chapel) is 408 feet in length. The western front is highly decorated with a profusion of niches and elegantly carved figures, and presents one of the richest façades of any building in Europe. The towers are highly interesting to the antiquary as specimens of Norman architecture. The interior is also exceedingly fine; the vaulted roof of the nave is supported by clustered columns, surmounted by fine pointed arches; as is also that of the choir, which is separated from the nave by a screen of exquisite workmanship. The chapter-house is a beautiful edifice, with a handsome oak roof: it was used as a stable by Cromwell and his soldiers, but has since been thoroughly repaired, as other parts of the building also have lately been.

In the north aisle are the splendid monuments of Sir Richard and Bishop Stapleton. The organ, with the exception of the one at Haerlem, is perhaps the largest in Europe: the large pipes are nearly twenty-three feet in height, and four feet in circumference. (For a further account of this truly magnificent building we must refer the reader to Risdon; Oliver; Britton's *Cathedral Antiquities*, &c. &c.)

The city was antiently held in demesne by the crown; its earliest charter was granted by Henry I., and confirmed by Henry II. and Richard I. The governing charter was granted by George III. in 1770. The corporation hold a court of quarter-sessions, and the assizes are held by the judges of the western circuit twice a year for the county of the city at the guildhall, and twice a year for the county at the session-house. There is also a county court, and a court of requests for the recovery of debts under 40*s*., the former held every Tuesday, the latter once a fortnight. Petty sessions are held before the magistrates of the county every Friday at the session-house; and some magistrate of the city sits every day at the guildhall. Under the Municipal Act, Exeter is divided into six wards, with twelve aldermen and thirty-six councillors.

Exeter has returned two members to parliament ever since the reign of Edward I. At the first election after the passing of the Reform Act, there were 2952 registered voters. The population of the city and borough is 28,242, of whom 15,559 are females. There are not many manufactories, and the population is chiefly employed in handicraft and the retail trade.

The city of Exeter comprises the parishes of Allhallows, Allhallows on the Walls (the church of which has been demolished), St. Edmund, St. George, St. John, St. Kerrian, St. Lawrence, St. Martin, St. Mary Arches, St. Mary Major, St. Mary Steps, St. Olave, St. Pancras, St. Paul, St. Petrock, St. Sidwell, St. Stephen, and the Holy Trinity, and the parochial chapelries of St. David and St. Sidwell, and the extra-parochial precincts of the Cathedral Close and Bedford Chapel, all in the archdeaconry and diocese of Exeter. There are besides these several other chapels, as well as places of worship for Baptists, Quakers, Independents, Wesleyan and other Methodists, Unitarians, Catholics and Jews.

The town is pleasantly situated on a steep acclivity on the river Ex, over which a handsome stone bridge was erected in the year 1778, at an expense of about 20,000*l*., a little above the site of an antient bridge originally built in 1250. The streets, with the exception of the High Street and Fore Street, are generally narrow, but there are some handsome squares and terraces in Northernay, Southernay, &c., which contain many well-built houses. The town is lighted with gas, and well supplied with water by waterworks erected in 1794. The subscription ball-room is one of the finest country ball-rooms in England; it measures eighty feet by forty, and is very handsomely fitted up. There

is a subscription library in Fore Street; and in 1813 the Devon and Exeter Institution was founded, for the promotion of arts, &c., the library of which contains about 10,000 volumes. The theatre is a neat building. To the north of the city are the cavalry barracks, and very near them is the new bridewell and the county gaol, both of which are judiciously planned, and contain the governor's residence, chapel, &c. There is also a city prison. The port of Exeter extends from the coast near Lyme Regis to the Ness Point. The trade principally consists in woollen goods and manganese; the imports are wine, hemp, tallow, &c. A branch bank has lately been established here by the Bank of England. The market day is Friday; but there is a daily sale of meat, vegetables, fish, fruit, &c. Fairs are held on the third Wednesdays in February and May, the last Wednesday in July, and second Wednesday in December. There is a great horse fair held at Alphington, about one mile from Exeter.

The free grammar-school was founded by the citizens in the reign of Charles I.; the sons of freemen are instructed gratuitously. There are fifteen exhibitions to either of the universities of Oxford or Cambridge, six of which are of 36*l.* each, the others are much less. The school-room is partly formed of the remains of an antient convent, of Augustine friars founded in 1239. There are no less than ten charity schools in Exeter, independent of Sunday-schools; amongst others are St. Mary Arches' school, founded in 1686, by W. Wootton, for the instruction on Dr. Bell's system of forty-four boys, of whom thirty are clothed; the Devon and Exeter Central School, founded in 1811, where about 430 boys and 270 girls are taught to read and write; and the Exeter British School, where about 130 boys and about the same number of girls are instructed, without regard to party or sect. The Devon and Exeter Hospital is supported by subscription, and has a considerable income arising from funded property: it now contains above 200 beds. There is a lunatic asylum admirably managed, as well as a dispensary, an eye infirmary, and an institution for the deaf and dumb. The workhouse forms a large range of buildings in the London road; it contains a governor's house, committee rooms, &c., and affords accommodation to several hundreds of the poor. A savings' bank was established in 1815, and a mechanics' institution, consisting of above 200 members, in 1825. Amongst other alms-houses and poor-houses are those respectively founded by Mr. John Stevens, Mr. John Palmer, Sir Thomas Lethbridge, and Mr. John Webb. There are also numerous private donations and bequests for the instruction and benefit of the poor.

Many eminent men have been natives of Exeter; among the most distinguished are Josephus Iscanus or Joseph of Exeter, a Latin poet of the twelfth century, Baldwin, archbishop of Canterbury, Sir Thomas Bodley, founder of the Bodleian Library, Lord Chancellor King, Lord Gifford, and Sir Vicary Gibbs.

EXETER or EXON DOMESDAY, the name given to a record preserved among the muniments and charters belonging to the dean and chapter of Exeter cathedral, containing a description of the western parts of the kingdom, comprising the counties of Wilts, Dorset, Somerset, Devon, and Cornwall; supposed, as far as it extends, to contain an exact transcript of the original rolls or returns made by the Conqueror's commissioners at the time of forming the General Survey, from which the Great Domesday itself was compiled. It is written on vellum in the form of a book of the small folio size, containing 532 double pages. The skins or sheets of vellum of which it is composed vary in the number of leaves which they comprise from one to twenty; the lands of each of the more considerable tenants beginning a new sheet, and those of almost every tenant a new page. The lands in the counties of Devon, Somerset, and Cornwall belonging to one tenant, are classed together, the counties following each other, though not always in the same order; and, in like manner, the summaries of property in Wilts and Dorset are classed together.

The manuscript begins with the 'Inquisitio Geldi,' or taxation of the hundreds of Wiltshire; of which it contains no less than three copies, the third seeming to be a corrected edition of the other two. The taxation of the hundreds of Dorsetshire follows, and after it those of Devonshire, Cornwall, and Somersetshire. The Inquisition for each hundred states:—1. The total number of hides; 2. the number held by the king and his barons in demesne, with an enumeration of those for which the tax was not paid; 3. the number of hides for which the tax was paid, and its amount; 4. the tax in arrear, and the reasons for its so remaining. Throughout, the geld or tax is computed at the rate of 6*s.* for every hide.

Upon collating the returns of lands which form the great body of the Exeter Survey with the Exchequer Domesday, they have been found, with a few trifling variations, to coincide; one entry of property alone being discoverable in the Exeter which is omitted in the Exchequer Domesday, relating to Sotrebroc in Devonshire. The Exeter manuscript, however, is not complete in its contents. There are considerable omissions of lands in Wiltshire, Dorsetshire, and Devonshire; but these have evidently been cut out and lost. In Cornwall every manor mentioned in the Exchequer occurs in the Exeter Domesday. One leaf of this record was accidentally discovered in private possession within these few years, and has been restored to the manuscript. In the spelling of the names of places and persons there is a remarkable difference between the two records. Rilchetona, in the Exon Domesday, fol. 101, is Chichetone in the Great Domesday, tom. i., fol. 120. Modiforda, Exon, fol. 116, is Mundiforda in Domesday, tom. i., fol. 87. Pillanda, Exon, fol. 127 *b.*, is Welland, Domesday, tom. i., fol. 102 *b.* Illebera, Exon. fol. 139 *b.*, is Lilebere, Domesday, tom. i., fol. 88. There are also many observable differences in the names of persons, as Ulwardus Wite, mentioned in the Exon Domesday, fol. 116, is Vlwardus Albus in the Exchequer Domesday, tom. i., fol. 87. The Abbot of Battle in Sussex is called Abbas de Prelio in the Exon Domesday, fol. 195; but in the Exchequer Domesday, Abbas de Labatailge. Abbas de Aliennia, Exon, fol. 280, is Abbatia de Adelingi in Domesday. Adret, Exon, fol. 488, is both Eldred and Edred, Domesday, tom. i., fol. 118. Willielmus Capra of the Exon, fol. 398, is Willielmus Chievre in the Great Domesday. The names of tenants in King Edward's time are far more numerously preserved in the Exon than in the Exchequer Domesday. In the systematic arrangement of the subject matter the Exchequer Domesday bears unquestionably a decided preference over the Exon Domesday. Occasional insertions in the margin of the Exon Survey are entered in the text in that of the Exchequer. The lands of the great barons also in the Exon Survey are in a few instances intermixed. In folio 161 of the Exon, although the title of the lands described is 'Terra Abbatis Glastingheberiensis in Devenescira,' yet in fact there is only one of the manors in that county; the rest are all in Somersetshire, and are entered as such in the Great Domesday. On the contrary, in fol. 194 of Exon, the 'Terræ Ecclesiarum quæ datæ sunt Sanctis in Elemosina,' from all that appears on the face of the record are in Somersetshire; whereas they are really in Devonshire, and are so placed in the Exchequer Domesday.

The most striking feature however of the Exeter Domesday, in which it uniformly supplies us with additional knowledge to that in the Exchequer Survey, is the enumeration of live stock upon every estate; there is an account of the number of oxen, sheep, goats, horses, and pigs, exactly in the same manner as it is given in the second volume of the Great Domesday. The reason for omitting this enumeration in the breviated entries of the first volume of the Great Survey is self-evident. The live stock was altering every day and year; the enumeration of it therefore could be of no further use than for the exact time when the survey was made. A comparison of this part of the Exeter with the second volume of the Great Survey tends greatly to corroborate the notion that the returns of the counties of Essex, Norfolk, and Suffolk, were transcribed in full from the original rotuli, in the same manner as the Exeter Domesday. The difference between the two surveys as to diction, when they agree in sense, is likewise remarkable; as for instance,

Exchequer Domesday.	*Exeter Domesday.*
Acra	Agra
ad arsuram	ad combustionem
censores	gablatores
clerici	sacerdotes
geldabat	reddidit Gildum
leuca	leuga
manerium	mansio
ad opus militum	ad soldarios
molendinum	molinus
nummi	denarii

in paragio . . .	pariter
portarii . . .	portatores
Exchequer Domesday.	*Exeter Domesday.*
pastura . . .	pascua
poterat ire quo volebat (tom. i., fol. 97 *b*.) . .	poterat sibi eligere dominum secundum voluntatem suam cum terra sua (fol. 383).
quarentena . .	quadragenaria
sylva . . .	nemusculum
T. R. E. (*tempore regis Edwardi*) . . .	Die qua rex Edwardus fuit vivus et mortuus
tainus . . .	tagnus
Terra est viii. car. . .	possunt arare viii. carr.
Terra Regis . .	Dominicatus Regis, (and in one instance) dominicatus Regis ad regnum pertinens
Totum valet xxi. lib.	Hæc mans. reddit ad opus abb. x. & viii. lib. et ad opus tagnorum iii. lib.

The utility of this record for the purpose of comparison with the Exchequer Domesday is obvious. The Exeter Domesday was published with several other surveys nearly contemporary, by order of the Commissioners upon the Public Records, under the direction of Sir Henry Ellis, in a volume supplementary to The Great Domesday, folio, London, 1816. Our account of this record is chiefly derived from the Introduction to that volume.

EXETER COLLEGE, OXFORD, was originally founded in 1314, by Walter de Stapledon, bishop of Exeter, and some time lord high treasurer of England, and was then called Stapledon Hall. The bishop removed hither his scholars from Hart Hall, and made a foundation for a rector and twelve fellows. Of these thirteen he directed that eight should be elected from the archdeaconries of Exeter, Totness, and Barnstaple; four from the archdeaconry of Cornwall; and that one should be nominated by the dean and chapter of Exeter, from any place they might deem most fit, provided that he was in priest's orders. In 1404 Edmund Stafford, bishop of Exeter, added two fellowships from the diocese of Salisbury, and obtained leave to give the college its present name. In 1565 Sir William Petre, knight, secretary of state, and privy counsellor to Henry VIII., Edward VI., Queen Mary, and Queen Elizabeth, added eight fellowships for the counties of Devon, Somerset, Dorset, Oxford, Essex, and any others in England in which he or his heirs might have lands or possessions. These counties at present are Norfolk, Suffolk, Middlesex, Hampshire, and Kent. Charles I., in 1636, annexed one fellowship for the islands of Jersey and Guernsey, the candidates for which are nominated by the dean and jurats of one of these islands alternately. Lastly, Mrs. Shiers, who died in 1700, left certain rents, out of which two fellowships were founded for the counties of Hertford and Surrey, to which the five senior fellows alone elect. The candidates for all fellowships in this college are required by the statute to be, at least, *Generales Sophistæ* in the university. The day of election is the 30th of June, except for the Hertford and Surrey vacancies, when it is on St. Stephen's day. The present foundation consists of a rector and twenty-five fellows, besides whom there are numerous scholarships and exhibitions: and among these, three Eton Collegers, appointed by the provost and fellows of Eton; three from Exeter school, nominated alternately by the dean and chapter and chamber of Exeter; two from Truro school, nominated by the trustees of that school; and two from Exeter school. Two scholarships have been more recently founded by a bequest of the late William Gifford, for natives of the county of Devon, with a preference to candidates from the school of Ashburton.

Among the eminent men who have received their education here may be enumerated John de Trevisa, Sir John Fortescue, Sir John Doddridge, Sir William Noy, Joseph Caryl, Anthony Ashley Cooper, Lord Shaftesbury, Maundrell the traveller, John and Charles Wesley, Toup, Tindal the continuator of Rapin, and Dr. Kennicot.

The front of the college, which is opposite Jesus College, extends two hundred and twenty feet, with a large central gateway, consisting of a rustic basement, from which spring four pilasters of the Ionic order, supporting a semicircular pediment, crowned by a balustrade. The greater part of this front was renewed in 1835 with Bath stone. The hall was erected by Sir John Acland in 1620. The chapel, begun in 1622-3, was completed by Dr. George Hakewill, afterwards rector. The library was erected in 1778, after a design of the late Rev. W. Crowe, public orator.

On the 31st December, 1836, there were 304 members upon the college books. There are twelve benefices in the patronage of this society, one of which, the vicarage of Kidlington, in Oxfordshire, is annexed to the rectorship. The bishop of Exeter is the visitor of this college.

(Chalmers's *Hist. of the Colleges and Halls of Oxford*, 8vo., Oxf., 1810, vol. i., p. 62-76; *Oxford Univ. and City Guide*, 8vo.; *Oxford Univ. Calendar*, 1837.)

EXETER. [NEW HAMPSHIRE.]

EXHAUSTIONS, METHOD OF. [GEOMETRY OF THE GREEKS.]

EXHIBIT, a deed or writing proved by a witness or admitted by the parties in a suit in chancery, in the equity side of the Court of Exchequer, or in bankruptcy.

EXHIBITION. [SCHOOL.]

EXILE. [BANISHMENT.]

EXMOUTH. [DEVONSHIRE.]

EXOCA'RPEÆ, a small division of Thymelaceous plants. [THYMELACEÆ.]

E'XODUS, THE BOOK OF, is the second of the Pentateuch, or Five Books of Moses, and derives its name from the principal event recorded in it, namely the departure of the Israelites from the land of Egypt, which, in the Greek Septuagint translation, is expressed by the word éxodos ("Ἔξοδος), that is, the going out. In the original Hebrew it is named, according to the usual Jewish mode, from the initial words, ואלה שמות *ualh shmut*, or, as read with the Masoretic points, Ve-aleh Shemoth, 'These are the names.' This book records the slavery and cruelty endured by the descendants of Israel (Jacob) under the kings of Egypt; the birth, exposure, and preservation of Moses; his flight into Midian; his divine mission to Pharaoh (at the age of 80; vii. 7); the miracles performed by him and his elder brother, Aaron; the ten plagues inflicted on the Egyptians; the institution of the Passover; the departure of the Israelites from Egypt; their miraculous passage across the Red Sea; the destruction of the Egyptian army; the journeyings of the Israelites in the Arabian desert; their murmurings against God and Moses; their resumption of the Egyptian worship of the calf under the direction of Aaron, and their consequent punishment; the promulgation of the law from Mount Sinai; and the erection of the tabernacle, or portable temple. The king, Pharaoh (a general Egyptian appellation of royalty), for whom the Israelites built the treasure cities, and by whom their male children were ordered to be drowned (chap. i.) is usually considered by the commentators to be Rameses, the eldest son of Sesostris; and the Pharaoh whose army perished in the Red Sea (xiv. 27) is supposed to be his son and successor, Amenophis the Second, or according to others, the Third. Le Père Pezron says he was Pharaoh Alisphragmuthosis, by whom the Hyksos, or Phœnician Shepherds, were expelled from Lower Egypt, whence the Israelites departed. The same chronologist makes the establishment of the Shepherd dynasty at Heliopolis coincident with the appearance there of Joseph from Canaan. (See the *Dissertation of* Perizonius *on the identity of the Hyksos and the Hebrews*.) The Mosaic exodus is noticed by several antient writers, but with brevity and apparent contempt. The Egyptian historians, Manethon and Chæremon, as cited by Josephus (*Against Apion*, l. i., c. 9, 11, 12), state that 250,000 leprous people, and others afflicted with contagious diseases were banished from Egypt (*Exod.* xii., 39, 'they were thrust out of Egypt') by king Amenophis; and that their chief was a priest of Heliopolis named Moses, who furnished them with a system of religion and laws. (See a similar account in Josephus, *Hist.*, l. v. c. 34; Tacitus, *Hist.*, l. v. c. 3; Diodorus Sic. *in Photii Biblioth.*, l. xxxiv.; Justin, l. xxxvi. c. 2.)

The period over which the history in the book of Exodus extends consists of 145 years, that is, from the death of Joseph (B.C. 1635) to the formation of the tabernacle in the desert of Arabia (B.C. 1490), one year after the exode in the year B.C. 1491. Mr. Horne, in his 'Introduction to the Bible,' adopts the general opinion of commentators that the book was written by Moses, yet he thinks that it cannot be determined at what time of his life; but, as it is stated (xvi. 35) that 'the children of Israel did eat manna 40 years until they came unto the borders of the land of Canaan' that is, on the banks of the Jordan, opposite Jericho, when

and where Moses died (*Gen.* xxxiv.), and, 'as things cannot be historically related,' as Mr. Horne observes, 'until they have actually taken place,' it is evident that, if Moses is the author, he must have written it immediately before his death (B.C. 1451). It must be observed however that, among biblical critics and chronologists a great difference of opinion exists as to what date should be assigned to the departure of the Jews from Egypt, and as to the book of Exodus being written by Moses. In chronological works the exodus forms the fourth grand epocha in the antient history of the world: thus, 1. The creation of Adam. 2. The Deluge of Noah. 3. The call of Abraham (his emigration from Chaldæa into Canaan). 4. The Departure of the Israelites from Egypt. This last event, according to the Hebrew text of the Scriptures, took place B.C. 1491; but according to the Samaritan text, which is the primitive Hebrew (Dr. A. Clarke) it occurred 267 years earlier, that is, B.C. 1758. The learned Pezron ('Canon Chronologique,' in his 'Défense de l'Antiquité des Tems,' 4to, 1691) adopting, with improvements, the chronology of the Alexandrine version, or Greek Septuagint, which adds 1500 years to the Hebrew age of the world, determines the exodus to have taken place A.M. 3953, and B.C. 2019. Whiston, Kennicott, Jackson, Brett, Hay, Geddes, and other divines, adopt the Greek chronology. Archbishop Usher ('Annales Vet. et Nov. Test.') prefers that of the Hebrew text. Dr. Andrews, in his 'Heb. Dict. and Chronol.' 1823, puts the exodus B.C. 1677. (See Dr. Hales's *Analysis of Chronology;* Sir John Marsham's *Chronicon Egyptiacum,* Ed.; Simson's *Chronicon Catholicon,* Lugd., fol. 1752; J. G. Frankius, *Novum Systema Chronol.,* Götting., fol. 1778; R. C. Beningsen, *Biblische Zeitrechnung,* Leips., 1763; Walker's *Analysis of Time,* 1796; *Remarks on the Bible Chronology,* 1830; *Criteria for determining the accuracy of Scripture Chronol.,* by J. Cullimore, 1830, p. 13.)

Moses, according to St. Justin, Tatian, Clemens Alexandrinus, Tertullian, Julius Africanus, and other Christian Fathers, as well as Josephus, Justus, Manethon, Ptolemæus of Mendes, Apion of Alexandria, Porphyry, and others, is supposed to have been contemporary with Inachus, whom the chronologists place from 270 to 450 years earlier than the birth of Moses according to the Hebrew text. (Du Pin, *Biblioth. Univer.;* Du Fresnoy, *Chronol.*) In the chronicon of Eusebius, the author of the Pentateuch is made contemporaneous with Cecrops, who became king of Athens (*Arund. Marb.*) 11 years before the birth of Moses (*Heb. text*), and, according to Pezron, 130 years after the death of Moses. (*Heb. text.*)

That the Pentateuch is not the production of Moses has been the opinion of many learned critics, both Christians and Jews, as Aben Ezra, Maimonides, Le Clerc, Dr. Middleton, Newton; and in Germany it is generally prevalent among the philosophical theologists of the *rational* school of Eichhorn. Dr. Geddes, who was deeply imbued with the German rationalism, makes the following statement in the preface to his new translation of the Bible from the Hebrew in 2 vols. 4to.:—'From intrinsic evidence three things to me seem indubitable. 1. The Pentateuch in its present form was not written by Moses. 2. It was written in the land of Canaan, and most probably at Jerusalem. 3. It could not be written before the reign of David, nor after that of Hezekiah. I would refer it to the reign of Solomon.' That is, about B.C. 1000, in or near the age of Homer and 500 years after that of Moses. Eichhorn (*Einleitung in das Alte Test.,* vol. ii. p. 245,) believes the first two chapters of Exodus to have been taken from the historical documents out of which the book of Genesis apparently was compiled. (See Astruc, *Conjectures sur les Mémoires originaux dont il parait que Moise s'est servi pour composer la Génése,* 12mo. Brussels, 1753.) By the Jews the Book of Exodus is divided into 11 paraches, or chapters, and 22 siderim, or sections. In English Bibles it is comprised in 40 chapters. Various passages and expressions in Exodus involve apparent difficulties which have exercised the critical skill of every commentator. All chronologists agree that from the time of the immigration into Egypt of Israel and his family (70 persons, chap. i.) to the exodus, was only 215 years; the 430 years mentioned xii. 40 signifying this period and a previous one of 215 years to the call of Abraham. The numeral increase of the children of Israel is therefore considered to be very unusual, since, in xii. 37, 38, it is said there were 600,000 men on foot, besides children and a mixed multitude, the total number, as computed by Dr. Adam Clarke in his Commentary, being 3,263,000 They are said to have been 'more and mightier' than the Egyptians, 'very mighty' (i. 9, 20), to have gone out with their 'armies' (xii. 51) 'harnessed,' that is, accoutred for battle (xiii. 18); and 'with a high hand' (xiv. 8), 'with flocks, and herds, and very much cattle' (xii. 38), but as they are also said to have been slaves to the Egyptians, who 'made them serve with rigour and hard bondage, in mortar, brick, and all manner of service in the field' (i. 14)—to have been led out of their nearest way to Canaan, lest, on seeing war with the Philistines, they should repent, and return to Egypt (xiii. 17), and to have been 'sore afraid' at the sight of the Egyptians' marching after them (xiv. 10), some commentators understand the word חמשים *pmshim,* to mean not harnessed, but slung together five in a string. Concerning the criminality of the Israelite women in borrowing and appropriating jewels and raiment of the Egyptians by the divine direction (iii. 21, 22, and xi. 2), and God's hardening the heart of Pharaoh (iv. 21), see *Explanations of Scripture Difficulties,* compiled by W. Carpenter, p. 35, &c. In xvi. 15 it is stated that the Israelites, when they first saw the manna, said one to another, 'It is *manna,* for they wist not *what* it was;' and in xxxviii. 8 of the English translation, it is said that the laver of *brass* was made of the looking-*glasses* of the women who assembled at the door of the tabernacle. These inconsistencies are avoided by Dr. Geddes; and he observes that the word מראת, *mrath,* translated looking-glasses, occurs in a hundred other places, but in no instance signifies the antient metallic mirrors. The ten miraculous plagues inflicted on the Egyptians are described in the following places:—1. Water turned into blood, vii. 14—25. 2. The land covered with frogs, viii. 1—15. 3. The dust of the land turned to lice, viii. 16—19. 4. The swarms of flies, viii. 20—32. 5. The murrain and death of all the cattle. 6. Ashes produce boils and blains on man and beasts, ix. 8—12. 7. The storms of devastating hail, rain, and fire, ix. 13—35. 8. All the land covered with locusts, x. 1—20. 9. Three days of darkness which might be felt, x. 21—27. 10. The death of all the first born of man and beast, xi. 5—7 and xii. 29, 30. The learned writer in the 'Universal History,' vol. 3, p. 374, shows that the Egyptian magicians and sorcerers were permitted to exhibit the power of the devil for the sake of exposing his comparative impotence; thus, although 'they did in like manner with their enchantments,' (vii. and viii.) in making their rods become serpents, in turning the Nile into blood, and in covering the land with frogs, yet, they could not, as Aaron did, turn the dust of the land into lice (viii. 18.) Jacob Bryant in his 'Treatise on the Ten Plagues,' 8vo., 1810, explains their adaptation to the peculiar character, habits, and notions of the Egyptian people, so as to cause the greatest possible aggravation of suffering and misery. The latter half of the 40 chapters of Exodus are occupied in announcing the civil, moral, and ceremonial law, and in describing the numerous articles of furniture, utensils, and sacerdotal raiment, for the celebration of sacrificial service in the tabernacle, or moveable temple, erected as a tent in the desert. The value of the gold appropriated to the vessels and ornaments of the adytum, or holy place, is stated in xxxviii. 24 at 29 talents and 730 shekels of gold. Each of the former being 5464*l.* 5*s.* 8¼*d.*, and each of the latter 1*l.* 16*s.* 5⅛*d.*, they amount to 159,793*l.* 11*s.* 3*d.*, that is, nearly 160,000*l.*

Many learned men, in observing the similarity of the Mosaic and Egyptian ritual and religious institutions as described in various antient writings, have assigned a greater antiquity to the latter, and contended that the former were a mere imitation. Dr. Geddes asserts that Moses made a selection and judicious composition from the antient Egyptian institutions. (See especially Spencer, *De Legibus Hebraicorum;* Sir John Marsham's *Chronicon Egyptiacum;* Jablonski's *Pantheon Ægyptiorum;* Ikenius, *Dissertatio de Institutis et Ceremoniis Legis.*) Plutarch (*De Iside*) and other antient authors prove that Jehovah or Jao was the sacred name of God among the Egyptian priests; and that it was not known to the Israelites before their residence in Egypt is stated in *Exod.* vi. 3. The 'I AM' of chap. iii. 14 is compared with the Egyptian inscription on the personification of the universe, 'I am all that is.' (See Plutarch, περὶ τοῦ Εἰ ἐν Δελφοῖς.) Aaron's oracular breast-plate (xxviii. 15—30) is thought

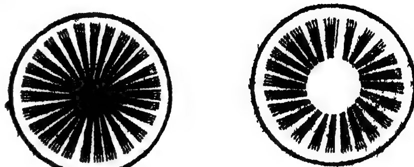
to be identical with that of the Egyptian chief judge, as described by Diodorus Sic. l. i. c. 2, sec. 26.

The learned Huet, Vossius, and others give curious parallels of the birth, life, and deeds of Moses with the primitive Egyptian Bacchus, but this is not more strange than the statement of Origen, who says in his 'Homily on Exodus' that Pharaoh is the devil, his daughter the church, and the two midwives (i. 15) are the 'Old and New Testament.' (See *The Scholia* of Dathe, Rosemüller, Schulz, Bauer, and Eichhorn; Willet's *Hexapla or Sixfold Comment on Exodus; Translations and Comments*, by Ainsworth, Hopkins, and Bishop Kidder; Dr. A. Clarke's *Bible*; Horne's *Introduction*, and list in Watt's *Bibliotheca*.)

EXOGENS, the largest primary class in the vegetable kingdom, are so named in consequence of their woody matter being augmented by additions to the outside of that which is first formed near the centre. As long as they continue to grow they add new wood to the outside of that formed in the previous year, in which respect they differ essentially from Endogens, whose wood is constructed by successive augmentations from the inside [ENDOGENS.] All the trees of cold climates, and the principal part of those in hot latitudes, are exogenous. In many cases they are easily recognised by the wood of each different year forming a distinct zone, so that a section of their wood exhibits a number of concentric circles; but there are so many exceptions to this rule as to render it necessary to consider this character as by no means essential to them.

The nature of the exogenous mode of growth will be best compared with that of an Endogen, if we pursue the same mode of illustration as in the article which treats of the latter form. We will therefore proceed from an explanation of the typical mode of growth in a common Exogen to such remarks as we may have to offer upon deviations from it.

In an Exogen of ordinary structure the embryo consists of a cellular basis, in which there is usually no trace of woody or vascular tissue; but as soon as germination commences fine ligneous cords are seen proceeding from the cotyledons towards the radicles from the opposite sides of the young stem, meeting in the centre of the embryo, and forming a thread-like axis for the root.* As the parts grow the ligneous cords are increased in thickness and number, and having been introduced among the cellular basis of the embryo, are separated from each other by a portion of the cellular substance, which continues to augment both in length and breadth as the woody cords lengthen. By degrees the plumule or rudimentary stem becomes organized, and having lengthened a little, forms upon its surface one, two, or more true leaves, which gradually expand into thin plates of cellular substance traversed by ligneous cords or veins converging at the point of origin of the leaves. If at that time the interior of the young plant is again examined, it will be found that more ligneous cords have been added from the base of the new leaves down to the cotyledons, where they have formed a junction with the first wood, and have served to thicken the woody matter developed upon the first growth. Those ligneous cords which proceed from the base of the leaves do not unite in the centre of the new stem, there forming a solid axis, but pass down parallel with the outside, and leave a small space of cellular tissue in the middle; they themselves being collected into a hollow cylinder, and not uniting in the middle until they reach that point where the woody cords of the cotyledons meet to form the solid centre of the root. Subsequently the stem goes on lengthening and forming new leaves: from each leaf there may be again traced a formation of woody matter disposed cylindrically as before, and uniting with that previously formed, a cylinder of cellular substance being left in the middle; and the solid woody centre of the root proceeds in its growth in a corresponding ratio, lengthening as the stem lengthens, and increasing in diameter as the leaves unfold and new woody matter is produced: the result of which is, that when the young Exogen has arrived at the end of its first year's growth it has a root with a solid woody axis, and a stem with a hollow woody axis surrounding cellular tissue, the whole being covered in by a cellular integument. But as the woody cords are merely plunged into a cellular basis, the latter passes between them in a radiating manner, connecting the centre with the circumference by straight passages, often imperceptible to the naked eye, but always present. The following diagram illustrates this:—

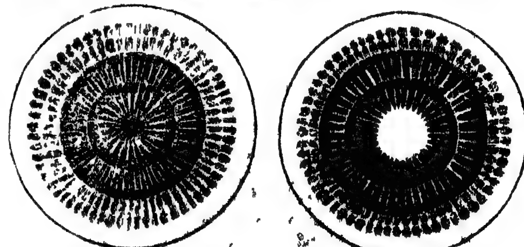


Root. Stem.

Here we have the origin of *pith* in the central cellular tissue of the stem, of *wood* in the woody axis, of *bark* in the cellular integument, and of *medullary processes* in the radiating passages of cellular tissue connecting the centre with the circumference.

The woody axis is not however quite homogeneous at this time. That part which is next the centre contains great numbers of vessels of different kinds, particularly dotted vessels (vasiform tissue); the part next the circumference is altogether destitute of vessels, and consists of woody tissue exclusively: of these two parts that with the vessels belongs to the wood, properly so called, and serves as a mould on which future wood is added; the other belongs to the bark, separates under the form of liber, and in like manner serves as a mould upon which future liber is disposed.

At the commencement of a second year's growth the liber separates spontaneously from the true wood, a viscid substance called *cambium* is secreted between them, and the stem again lengthens, forming new leaves over its surface. The ligneous cords in the leaves are prolonged into the stem, passing down among the cambium, and adhering in part to the wood and in part to the liber of the previous year, the former again having vessels intermingled with them, the latter having none. The cellular tissue that connected the wood and liber is softened by the cambium, and grows between them horizontally while they grow perpendicularly, extending to make room for them, and consequently interposed between the woody cords of which they each consist, forming in fact a new set of medullary processes terminating on the one hand in those of the first year's wood, and on the other in those of the first year's liber. This addition of new matter takes place equally in the stem and in the root, the latter extending and dividing at its points, and receiving the ends of the woody cords as they diverge from the main body. The following diagram illustrates this, and shows, when compared with the last, what difference there is in the appearance of the stem of an Exogen one and two years old.



Root. Stem.

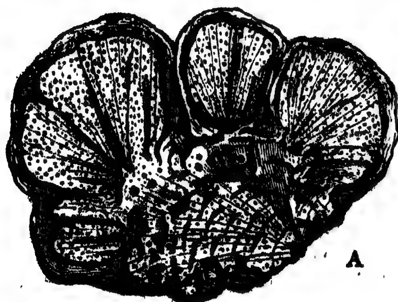
And thus, year after year, the Exogen goes on, forming zone upon zone of wood, which is permanent, and zone within zone of liber, which perishes as the stem increases in diameter. [BARK.]

If this account is compared with that already given of Endogens, it must be obvious that the stem of these two great classes is formed from the very beginning in an essentially different manner. Endogens have no cylindrical column of pith; their woody arcs are never collected into a cylinder, through the sides of which the cellular tissue passes in the form of medullary processes; and the woody matter of their bark, so to call their cortical integument, is not parallel with that of the wood and spontaneously separable from it; not to speak of important anatomical differences, or of the concentric arrangement eventually assumed by the wood of Exogens. The only points in which the growth of the stem of Exogens corresponds with that of Endogens are the following: in both classes the woody

* In the article Endogens the reader is requested to make the following correction in the early part of the fourth paragraph:—for (fig. A, p. 396) read (A); and twenty lines farther on, for (fig. A) read (A).

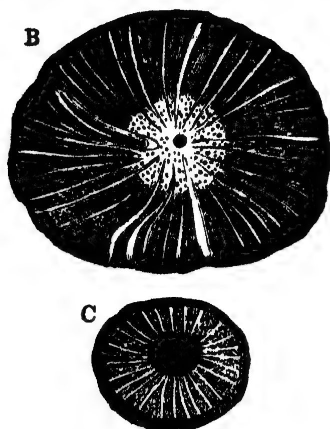
matter is connected with the leaves; in both a cellular substance is the basis of the whole structure, and extends horizontally wherever it is necessary to do so; and in certain Exogens woody arcs, stated to be like those of Endogens, are found in the pith. These cases properly belong to anomalous forms, but nevertheless may be noticed here, in consequence of their direct connection with this branch of the subject. One case is that of Zamia: but as that genus now belongs to the new class of Gymnosperms and not to Exogens proper, it need not be considered here. The other cases are Piper, Nyctaginaceous plants, and some others. Professor Schultz states (*Natürliches System des Pflanzenreichs*, p. 320, &c.) that in Piper, Mirabilis, and Boerhaavia, the central part of the stem consists of cellular tissue, amongst which cords of spiral vessels and woody tissue are placed either without order, or (in Boerhaavia) in a cruciate manner as in tree-ferns, and that on the outside of this the woody bundles are arranged circularly into a cylinder. A similar statement had long previously been made by Mirbel, who ascribes to Mirabilis and some Umbelliferous plants longitudinal vessels in the pith (*Elém. de Physiol. Veget.* i. 112), and by Professor Meyer, who finds the pith of Mirabilis longiflora and dichotoma, Boerhaavia scandens, and Oxybaphus Cervantesii abounding in many large bundles of spiral vessels within the woody radiated zone. (*De Houttuynia atque Saurureis*, p. 40.) This, if correctly described, only shows that in certain Exogens a portion of the central tissue is placed at first in a confused manner, and that the wood does not assume a definite circular disposition till afterwards; that it does assume it eventually is admitted. We find in Piper nigrum and Lonchitis that from the beginning the woody bundles are placed circularly, but they are separated by a good deal of cellular tissue, and do not assume in the first zone the wedge-like or triangular form which is most common in Exogens, and which they themselves at last take on. In Boerhaavia repanda, a specimen of which is now before us, we find the wood regularly disposed in two zones, and instead of spiral vessels a very singular structure in the pith, which is filled with fistular passages of lax soft spheroidal cellular tissue surrounded by smaller, harder, and more cubical cellular tissue which passes off into the medullary processes. It is in such plants as Piper incanum that the organization of Exogens most nearly approaches that of Endogens; but in the first place the whole race of Pipers forms a sort of transition from Exogens to Araceous Endogens; and secondly, it is probable that when they are most endogenous in appearance they are not really so in regard to the final development of their woody tissue.

Let it however be admitted that in certain cases Exogens are, in the centre of their stem, organized less regularly than usual; this will offer no argument in favour of their analogy with Endogens. In all such cases it will be found that they eventually assume their typical conformation. We are acquainted with some striking proofs of this. Among twining plants of tropical countries, we occasionally find instances like the following—



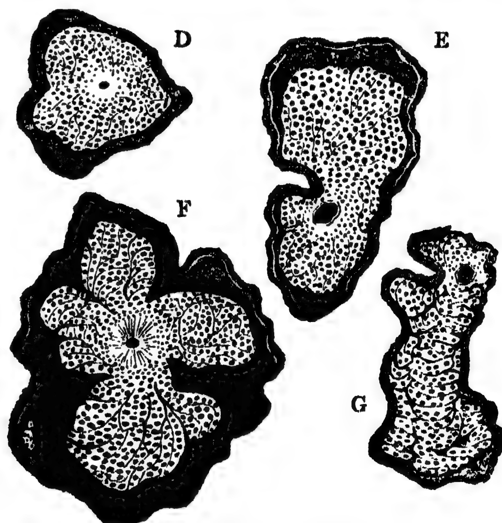
Beneath a most irregularly compressed and lobed bark there lies a mass of wood, apparently so confused and irregular in its arrangement in the centre, that nothing symmetrical can be made out by the most acute observer; but it will be seen that towards the circumference it distinctly assumes the radiated appearance of an Exogen. In other cases, where the structure is sufficiently regular, this circumstance is still more distinctly illustrated.

It is however more commonly at the centre that we look for typical structure, and at the circumference that we find irregularity; as if Exogens usually commenced their growth according to the plan to which nature has subjected them, and only deviated from it under the influence of unknown



causes coming into operation and controlling their development after they have advanced to a certain stage in their growth. Thus in the singular instances shown in cuts D, E, F, and G, the principal part of the stem is so confused and irregular as to look more like an Endogen than an Exogen, and a fragment might easily be mistaken for the former; nevertheless in a young and tolerably regular shoot (D) the radiated appearance is sufficiently well marked; and in two others, irregular and distorted as they are (E and G), the central pith is visible, although far out of the centre; and in the fourth (F) the centre has not only pith, but a radiated structure that is quite regular.

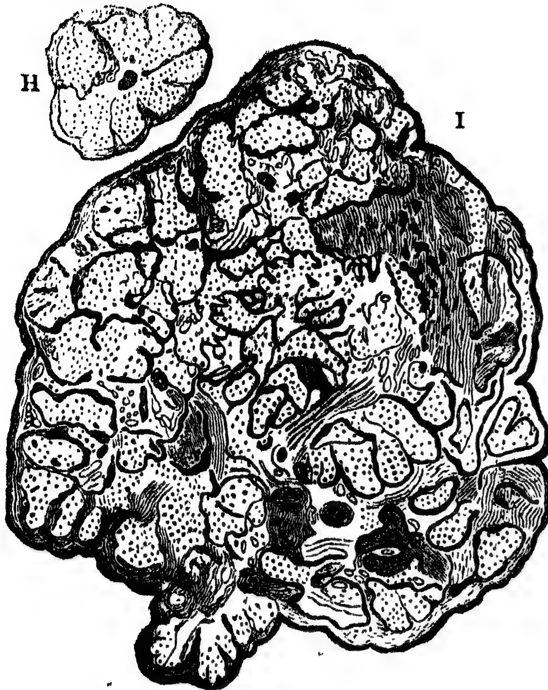
By far the most singular case of this sort is in an unknown twining plant in our possession from the Malayan Archipelago, of which the cuts H and I are representations In old stems of this plant a section exhibits a most irregular combination of wood, looking like palm wood, broken up into lobed cords lying amongst still more irregular cellular



tissue, and inclosed in a common bark; so that we doubt whether it would be possible to tell to which class it really belongs, if it were not for its young shoots and the pith of the old ones. The latter may be seen lying quite out of the centre towards one side (near the bottom of our figure, a little to the right); and in the former (H) the pith is found with wood radiating around it, although still with sufficient irregularity.

The cases already given are evidences of exogenous wood being sometimes extremely different from the condition in which we see it in Europe, and attest the necessity of forming our ideas of its nature from a more extended examination than that which is commonly given to it. Several curious cases have been previously published by the author of this article (*Introduction to Botany*, edition 2, p. 77, &c.), and others have been noticed by other writers, but the subject has been so little investigated that we gladly avail our

selves of the present opportunity of making known some additional facts.



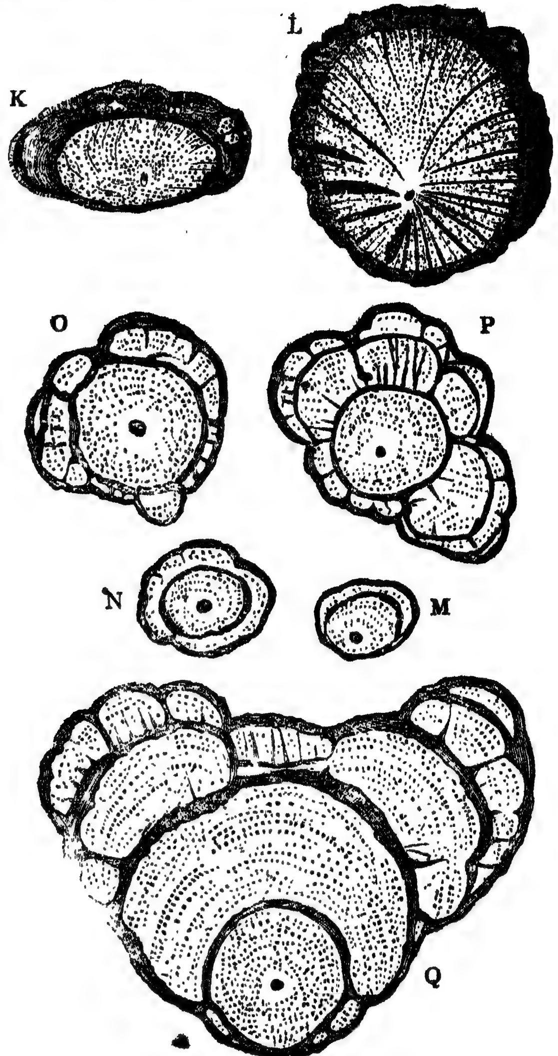
Irregularity in the structure of exogenous wood is usually owing either to a confused disposition of the tissue at some particular period of the growth, or to some derangement of the medullary processes, or to the absence of concentric circles, or to the formation of a deep zone of cellular tissue alternately with each zone of wood; or, finally, to the production of wood within the bark instead of beneath it. The first cause has been already sufficiently illustrated.

The sinuosity and partial obliteration of the medullary processes is a principal cause of the anomalous appearances at *figs.* D, E, F, G, where they are reduced to fine lines only visible beneath a microscope, and not radiating from the centre, but disposed in no certain manner, sometimes even transversely, owing to the excessive disturbance of the wood itself. In *fig.* I, the singularity of structure is owing in part to the excessive irregularity with which the wood has been developed, and in part to the looseness and irregular shape of the medullary rays, which seem huddled as it were round the woody cords; the latter are moreover extremely variable in size, some of them being as much as half an inch in diameter, and others so small as to consist of no more than a single vessel with its usual coating of woody tissue.

The absence of concentric circles is an extremely frequent occurrence in the wood of tropical countries, and it is almost certain that many families of Exogens never form them visibly under any circumstances. We say visibly, because in fact they must be annually formed in all cases, although we do not see them. The reason why Exogens have their wood marked by concentric circles is, that the ligneous tissue formed at the end of a season is more compact than that formed at the beginning, and hence, as the two are in juxtaposition, the difference in their density distinctly separates the one from the other. But if, from any cause,—whether proper to plants as species or owing to the external influence of an equable climate—the tissue of wood formed at all seasons is exactly alike, no zone will be visible, although in fact the formation of the wood is exogenous in the most regular manner. Such cases are seen at *figs.* K, L, S, and elsewhere in the illustrations of the present article.

It is not a little remarkable however that while the wood in some cases has no trace of zones, the bark should show them most distinctly, as in the instance of *fig.* K.

When a deep zone of cellular substance is formed between each zone of wood, a curious banded appearance is produced, as in the singular Indian climber marked N M O P Q, where extremely excentrical growth is combined with this peculiarity. At N we have the stem two years old, the second zone passing pretty regularly round the first and cut off from it by a broad deep band. At M the specimen is of the same age, but the second zone is formed on one side only.



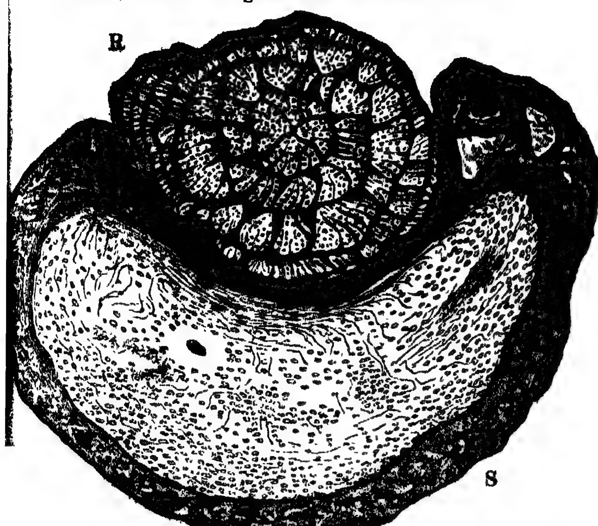
At O the specimen is two years old, with the first zone perfect, but the second broken up into a number of unequal irregular pieces, and it would seem as if a third growth had commenced on one side (to the left of the cut). At P the growth is of three zones, both the second and third being much lobed, and the third only extending three quarters round the second. Finally, at Q, where the irregularity is the greatest, there is a growth of four zones, the first symmetrical, the second very much deeper on one side than the other, the third but half surrounding the second, and the fourth formed only along two ridges on the third.

If it happens that, in addition to the presence of a thick cellular layer between each zone, the medullary processes are also very thick, an appearance still different from the last is produced, as at *fig.* R.

That wood is sometimes formed in the bark itself has been long since shown by Mirbel, in the case of Calycanthus floridus, where four additional woody columns appear equidistant in the bark, without any separate pith, but radiating from their first line of origin. We are now acquainted with many such cases. In *fig.* T are the commencement of four such columns at *a* on one side; but in that specimen no further indication of such a structure is visible; but at *fig.* U, which is the same plant at a more advanced stage of growth, four such columns on one side and one on the other have acquired considerable size, and each radiates towards the circumference of the stem. As in the Calycanthus, so in these and in all the other instances of the same kind, which these cuts represent (see F, K, and S), the woody columns of the bark are destitute of pith.

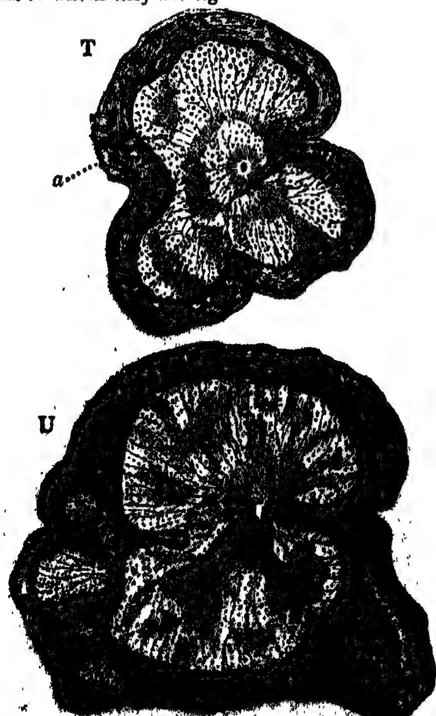
Perhaps what we have called the separation of zones of

wood at N M O P Q R, by thick layers of cellular tissue, are rather to be considered as other instances of wood formed in bark, but in a regular and uniform manner. We are



however uncertain how this may be, and prefer allowing the statement to stand in its present form until some one shall have examined such plants in their native forests at Sincapore.

In addition to such anomalous kinds of structure as those now described, Exogens, like Endogens, contain species, the organization of whose stem is so imperfect as to be reducible within no certain rules. Not to speak of Callitriche, Ceratophyllum, or Myriophyllum, wherein vessels are scarcely developed, and the woody matter merely forms a simple central axis of growth, we have in this class an exact parallel with Lemna among Endogens; some Podostemaceous plants have their leaves and stem completely fused together so as to resemble a Marchantia or an Alga. Such plants are to be regarded rather as instances of imperfect organization than as deviations from a typical form; and it is by no means a violent supposition to conclude that if their organization were more complete it would then become such as is characteristic of the class to which they belong.



From what has now been stated it will be obvious that the most essential features of exogenous vegetation are, not concentric circles in the wood, but an arrangement of the woody matter in a circular manner round pith, its augmentation by external additions, and the universal presence of medullary processes which give the wood a radiated character. With endogenous vegetation it agrees principally in the existence of two systems of growth; one original, cellular, and capable of extending and increasing in all directions; the other perpendicular, capable of augmentation in a longitudinal direction only, and developed subsequent to the first.

In both Exogens and Endogens therefore, the one system, which we have elsewhere called the fibro-vascular, but which may also be termed the woody, lies across the other, by which it is held together, as the threads of the warp in linen are held together by the woof, as the writer of this has long since pointed out in another place. (*Introduction to Botany*, book ii., chap. 3.) This appears to be the circumstance upon which the real explanation of all the phenomena of growth in stems must necessarily turn. We find it is adopted by M. Gaudichaud in his theory of the development of stems, of which a brief notice has been published in the 'Annales des Sciences,' new series, vol. v., p. 24; and Mirbel, the reporter in the place referred to, calls it 'la pierre angulaire de la théorie.' Connected with this, however, are two other facts that require also to be rightly understood; the one, that buds are emanations of the horizontal cellular system; and the other, that roots are elongations of the descending woody system. Unless these are coupled with the first-named fact there will be no solidity in the theory of growth now about to be explained.

Keeping in view all the phenomena above referred to, it will be obvious that the origin of wood is to be sought in the action of leaves, or of buds which are collections of leaves; and the theory of the formation of wood may be thus expressed:—

1. Wood is a collection of thick-sided tubular tissue, united in different ways in different species of plants. It is usually combined with vascular tissue, but does not necessarily include that kind of tissue.
2. It is always mixed with cellular tissue; through which it passes, and which in Exogens is arranged in the form of radiating plates.
3. It proceeds downwards from the leaves to the roots; either in parallel series, as in Exogens, or in curving and intersecting lines, as in Endogens.
4. It has the power of lengthening at its lower extremity as soon as it has once been generated, without any further impulse from the leaf from which it emanated. (This undoubtedly happens by the formation of new woody tubes at the points of those previously created.)
5. It is, in fact, the nutrient system of the leaves, and may be regarded as their roots.
6. The quantity of wood in a given plant will therefore bear a direct proportion to the quantity of leaves, or to their size and vigour.
7. In general its development takes place beneath the bark or cortical integument; but it may be found within the bark itself, in which case it continues to follow the order of development proper to it in its ordinary situation.

The woody part of bark is also derived from the leaves, and may be in like manner considered a state of their roots; but the office of its tubes is excrementitious rather than nutrient.

This view of the nature of wood is much the same as that first brought to the notice of modern botanists by Du Petit Thouars, an ingenious French physiologist, who, during many years, sustained the opinion in opposition to all his countrymen. It did not however originate with him, for it had been previously taken by others, who did not persevere like himself in maintaining it against the prejudices of their day, and who, moreover, did not possess the skill and extensive acquaintance with vegetable organization requisite to sustain a theory to which so many specious objections could readily be offered. The great error committed by Du Petit Thouars, in which it is probable that the slow progress of his opinions is really to be found, was his mixing up notorious errors with the truths of his theory. He insisted, for example, that the moment leaves begin to grow, wood is formed 'with the rapidity of lightning,' in continuous threads passing from the extremities of branches to the roots: this was anatomically untrue, for the woody tissue consists of tubes adhering end to end, and not continuous; and the rapidity assigned to their development was altogether imaginary. He next insisted that new roots could not

be developed till new leaves made their appearance this was disproved by the well-known fact that newly planted deciduous trees produce roots before their leaves appear. It may be doubted moreover whether he ever understood that buds originate exclusively from cellular tissue, and roots exclusively from fibro-vascular tissue; a fact, without attending to which, there is no possibility of explaining many common phenomena, but about which we conceive there is no sort of doubt.

It is not altogether a matter of theory that wood is formed of the roots of leaves imbedded in cellular tissue in a definite manner, according to the species: on the contrary, there are many curious facts to corroborate the supposition. The leaves of *Clianthus puniceus*, and many other plants. particularly *Gesneraceæ*, emit roots when cut off the stem to which they belong, and completely separated from the bud that is axillary to them. A knowledge of some such fact probably led to the absurd speculation, insisted upon by Bradley in the beginning of the last century, of forming plantations by sticking leaves in the ground. Du Petit Thouars found that the young leaves of *Dracænas* in the Isle of France root between the rind and old wood, forming rays of which the axis of the new shoot is the centre. The case of *Pandanus* we have adverted to elsewhere (*Introd. Bot.*, ed. 2nd, p. 262); and in the article Endogens of this Cyclopædia we have given a much more striking instance from *Barbacenia*. In that plant the cuts (which it should have been stated are representations magnified about three times) show that when undoubted roots proceeding from leaves are consolidated by passing down one above the other over the surface of the stem, precisely the appearance of palm-wood is produced. This we regard as conclusive as to the true nature of endogenous wood: and it would be unphilosophical to suppose that the wood of one great class of the vegetable kingdom is formed upon one plan, and of another class upon a totally different plan.

It must be highly satisfactory to those who have embraced the opinions of Du Petit Thouars, as modified by the writer of this and by others, to find how nearly they accord with what Mirbel represents to be the ideas of Gaudichaud upon the same subject. M. Gaudichaud is one of the very few physiologists who has studied this question with reference to tropical forms of vegetation. Most others have drawn their ideas exclusively from common European trees; in doing which, with all respect be it spoken, they appear to us to have begun at the wrong end. This distinguished botanist and traveller, in an unpublished memoir for which the Montyon prize was awarded by the French Academy in 1835, is represented as having collected a great mass of admirable observations upon the embryo, the germination, the mode of growth, the stem of a considerable variety of plants, and to have particularly adverted to the important phenomena of barking, striking from cuttings, grafting, pruning, and other horticultural operations; from all which he has deduced a theory of growth which M. Mirbel states to be substantially the same as that above explained. Among other curious facts, he mentions that he possesses a specimen of a cutting of *Cissus hydrophora*, with a bud upon it from whose base proceeds a woody network which partially invests the lower portion of the old wood, and afterwards escapes on all sides as root. (*Ann. Sc. N. S.* v. 29.)

We have in the first instance stated in what manner wood is formed according to our own views of the subject. It is now requisite that we should add the views of those who differ from us. That wood derives its origin directly from the leaves in any way whatever, is denied by some, who believe that it is a superficial deposit from the previously formed wood. But as those who entertain this opinion do not explain how the *first* wood originated, that theory need not be discussed. Mirbel seems to consider that both wood and the woody part of bark are independent formations created out of the cambium; but there is no cambium when the *first* wood of Exogens is generated, and that substance never makes its appearance at all in Endogens, which ne-



EXOGENOUS VEGETATION.

vertheless form wood: we however think it may be doubted whether this is the present opinion of that great physiologist. De Candolle says, that the woody and cortical layers are formed laterally from the cambium supplied by preexisting layers, and nourished by the descending sap; but we again say that this is inapplicable to Endogens; and moreover, that it is inconceivable upon such a theory how the *first* of the woody and cortical layers originated. Besides, woody matter appears before the new leaves can be supposed to have generated descending sap: it is not probable that so heterogeneous a formation as that of the wood is a mere superficial deposit, in which case it might be expected to be homogeneous; and finally, we do not know how, upon the supposition of De Candolle, to explain in any intelligible way why wood is found in pith, and in bark, as we have already shown that it often is. It would take us too far if we were to discuss this subject at greater length; the reader is therefore referred for further information to De Candolle's *Physiologie Végétale*, p. 146; Mirbel in the *Annales des Sciences* above quoted; Henslow in the *Magazine of Zoology and Botany*, vol. i., p. 32; and to our own *Introduction to Botany*, ed. 2nd, p. 256, &c.

The age at which Exogens may arrive is closely connected with their mode of development, as already shown in this work. [AGE OF TREES.]

If Exogens are distinctly known from Endogens by their peculiar manner of growth and by the arrangement of their woody matter, they are not less clearly defined by external marks.

Their *leaves* have the veins ramifying from the midrib, or ribs if there are several, in so intricate a manner as to give the appearance of irregular net-work. Their veins never run parallel with each other without ramifications; for if, as sometimes happens, they appear to do so, it will be found that the appearance is confined to the principal veins or ribs, and that the secondary veins between them ramify in the usual way. The leaves are moreover in most cases articulated with the stem, leaving behind them a clean scar when they die, not rotting away and hanging upon the stem in the form of a ragged sheath, as is common in Endogens. Moreover, they are frequently furnished with stipules, an unusual circumstance in Endogens.

The *flowers* of Exogens are usually constructed upon a quinary type, that is, they have five sepals, five petals, and five stamens, or some power of that number, now and then they vary to a type of four, or they exceed the number five, but we very rarely find the ternary structure of Endogens present in them. If, as in Anonaceæ, Berberaceæ, and other orders, the sepals and petals follow a ternary type, the number three is lost in the stamens or the ovary. The natural order Menispermaceæ is the only one among Exogens in which the ternary type regularly pervades all the parts of the flower.

In their manner of growth they rarely resemble Endogens. The consequence of the ramification of the veins is to give their leaves a broad and rounded figure, the effect of which upon their general appearance is to produce the rounded lumpish aspect that we recognize in all the trees naturally inhabiting this country. In no known instance does the stem grow by the development of a single terminal bud; so that we never find in this class the columnar aspect of palm-trees [GYMNOSPERMS], unless the genus Theophrasta be considered an exception. Consequently, a landscape consisting of nothing but exogenous plants would resemble the imaginary scene that forms the subject of the preceding cut.

The differences between Exogens and Endogens, thus strongly marked in the stem, leaves, and flowers, are connected with others in the *embryo*. In Exogens of the common kind this organ has two lobes, held together by a minute central body, the upper end of which, between the lobes, is the plumule or rudimentary stem, the lower the radicle or rudimentary root; the lobes themselves, or cotyledons, are rudimentary leaves. This structure is readily seen in a hazel-nut or a garden-bean; the deviations from it are few and unimportant as compared with those of Endogens. Three or a greater number of cotyledons may be present in a whorl, instead of two opposite to each other. Or one of the two cotyledons may be much smaller than the other, as in Trapa; or they may be deeply lobed, as in the garden-cress. But in all these cases the deviations are obviously reconcileable with the typical character of being *dicotyledonous*.

When the embryo of an Exogen germinates, the radicle simply lengthens at its point, without having to break through the coat of the embryo; on this account Exogens have been named *exorhizal*.

The result of this examination is, that the great class of Exogens has five important, and, in some measure, independent characters, by which its limits are settled.

1. The wood is exogenous.
2. The veins of the leaves are netted.
3. The fructification is formed upon a quinary or quaternary type.
4. The embryo is dicotyledonous.
5. The germination is *exorhizal*.

Hence Exogens have received two other names in allusion to such characters; they are commonly called *Dicotyledones*, and *Exorhizæ* is another but less common appellation. Moreover, they are the *Phanerocotyledoneæ* of Agardh, the *Anthophytæ* and *Carpophytæ* of Oken's school, the *Dichorgana* of Schultz, the *Phylloblastæ* of Reichenbach; not to mention other names still more obscure.

In consequence of imperfect development, and the abortion or multiplication of parts, many deviations occur from the above characters. But as in Endogens, so in these, there is not in consequence any real difficulty in distinguishing Exogens from other plants. Suppose the stem to be so slightly formed, as in Podostemaceæ or the aquatic Haloirageæ, as not to arrive at a state in which the exogenous arrangement is perceptible, we have the dicotyledonous embryo, and the typical number of the floral organs to guide us. Let the leaves appear as scales, as in Lathræa, Orobanche, and the like; still there is the embryo or again the floral proportions. If the fructification is absolutely ternary as in Menispermaceæ, the organization of the stem, leaves, and embryo reveals the true nature of such plants. Or if the embryo is undivided, as in Cuscuta, and at the same time the veins of the leaves deficient, and all this with an incomplete formation of woody matter, then the number of parts in the flower remains to prevent our falling into error. It is therefore always to be remembered, that the limits of this great class are not exclusively determined by one single character, but by a combination of five; a part of which may be occasionally exceptional or undiscoverable.

Like all other natural assemblages, Exogens have many analogies with other parts of the vegetable kingdom. We have already adverted to the Podostemaceous order of this class representing distinctly the Pistiaceous order, or at least Lemna among Endogens. In speaking of the latter class (vol. ix., p. 398) other cases have been noticed, and we now add that Piperaceæ are distinct analogies here to the Araceæ of Endogens, Chenopodiales to Glumosæ, and possibly Menispermaceæ to Smilaceæ.

Whatever uses there may be in the vegetable kingdom are to be found in this class, which comprehends four-fifths of the natural orders, and probably not much less than the same proportion of species. Timber, in particular, is their exclusive produce, and if corn has no direct analogy in Exogens, at least a substitute for it is furnished by the potato and the cassava. To speak therefore of its useful products would be, in fact, to explain the utility of plants to man, and this we shall do in a more appropriate place. [PLANTS.]

Considering the very great numbers of Exogens,—they may be rated at 50 or 60,000 at a low computation,—it is not surprising that it should be here that the systematic botanist experiences his great difficulties. No embarrassment worth notice occurs in the arrangement of Endogens, as has already been shown; but in Exogens the difficulties are so great as to have hitherto baffled the most acute writers. We do not mean with regard to the natural orders themselves, for they are in general well understood and defined: our observation applies to a collocation of the orders, or, in other words, to the construction of groups of a secondary value which shall be as natural and as well defined as the orders themselves. In a recent enumeration we find no fewer than 231 orders of Exogens. It is obviously impracticable to study so large a number of combinations without breaking them into groups, and accordingly various methods have been proposed.

Jussieu, adopting, to a certain extent, the views of his predecessors, considered—1st, the separation of the petals; 2nd, their combination; or 3rd, their absence, of primary consequence; and adding to this, 4th, the separation of the sexes in flowers having no petals, he formed the four groups of—1st, *Polypetalous*; 2nd, *Monopetalous*; 3rd,

Apetalous; and 4th, *Diclinous* plants. The three first of these he again subdivided according as their stamens or their corolla grew under the ovary (hypogynous), upon the calyx (perigynous), or upon the ovary (epigynous); then the monopetalous epigynous group was subdivided into plants having united stamens and those having them distinct; the result being 11 classes, which were placed by Jussieu in the following order:—

			Class.
Apetalous	Stamens epigynous		1
	„ perigynous		2
	„ hypogynous		3
Monopetalous	Corolla hypogynous		4
	„ perigynous		5
	„ epigynous	anthers united	6
		anthers distinct	7
Polypetalous	Stamens epigynous		8
	„ hypogynous		9
	„ perigynous		10
Diclinous			11

This was, however, so artificial a distribution, that botanists soon found it as unsatisfactory as it was simple. Various changes have therefore been recommended from time to time, some of which are the following:—

In 1813, De Candolle, dropping the names of all Jussieu's classes, and abolishing many of them, proposed to arrange as follows the 113 orders of Exogens with which he was at that time acquainted.

			Class.
Polypetalous	Petals hypogynous (*Thalamifloræ*)		1
	Petals perigynous (*Calycifloræ*)		2
Monopetalous	Corolla perigynous	*Corollifloræ*	3
	Corolla hypogynous		4
Apetalous		(*Monochlamydeæ*)	5

Thus the classes were reduced from eleven to five, which was a defect; but those which remained were supposed to be more natural, which would have been an advantage. Five years afterwards, in his 'Regni Vegetabilis Systema Naturale,' he added the names inclosed within brackets, and he broke up the Thalamifloræ into five cohorts, but without stating what orders he arranged under them. We do not find that he ever pursued the subject farther. Since that period this great botanist has occupied himself with the special study of the natural orders, and the public has derived no advantage from his general views, which is much to be regretted.

In 1825, Professor Agardh of Lund, now bishop of Carlsbad, proposed a great change in the subordination of Exogens, retaining the principles of primary division recognized by Jussieu and De Candolle, but forming them into twenty subdivisions, defined by various characters analogous to those by which the orders themselves are circumscribed. This, we believe, is the first step of any consequence towards putting Exogens into a more natural grouping than that of Jussieu: in many respects the subdivisions are, as far as they go, unobjectionable; but they have excited scarcely any attention among systematic botanists. The necessity, however, of some better method of subordination than that of Jussieu and De Candolle has become evident to everybody; and attempts have been made to effect this by Drs. Bartling, Schultz, Von Martius, and others on the continent, and by the author of the present article; not to mention certain transcendental German writers, whose views, as we do not understand them, we will not attempt to explain. In our own arrangement the class is first broken into the Polypetalous, Monopetalous, and Incomplete *subclasses;* the latter are next distributed in *groups;* and finally, the groups themselves have a subordination of *alliances*, beneath which the orders are disposed in numbers varying from 1 to 8 or more, the general result being 17 groups or 89 alliances. The following table will show upon what principle the groups and alliances have been constructed. It will be remarked that the terminations of the names express their value; the groups or highest combinations end in *osæ;* the alliances, or combinations of a lower kind, in *ales;* the orders in *aceæ;* the suborders in *eæ*.

EXOGENS.

Table of Groups.

Subclass 1. Polypetalæ.

	Groups.
Albumen very considerably larger than the minute embryo.	ALBUMINOSÆ.
Albumen absent, or only forming a layer between the embryo and the seed-coat.	
Ovary inferior (often with an epigynous disk).	EPIGYNOSÆ.
Ovary superior.	
Placentæ parietal.	PARIETOSÆ.
Placentæ in the axis.	
Calyx dislocated.	CALYCOSÆ.
Calyx complete; its parts being all on the same plane.	
Carpels united in a solid pistil, parallel with each other.	SYNCARPOSÆ.
Carpels oblique, upon a gynobase.	GYNOBASEOSÆ.
Carpels disunited.	APOCARPOSÆ.

Subclass 2. Incompletæ (or Apetalæ).

Calyx altogether absent.	ACHLAMYDOSÆ.
Calyx present.	
Embryo curved round albumen.	CURVEMBRYOSÆ.
Embryo straight.	
Stamens monadelphous.	COLUMNOSÆ.
Stamens distinct.	
Calyx tubular, often resembling a corolla.	TUBIFEROSÆ.
Calyx very imperfect.	RECTEMBRYOSÆ.

Subclass 3. Monopetalæ.

Fruit consisting of but one perfect carpel.	AGGREGOSÆ.
Fruit of several carpels.	
Ovary inferior.	EPIGYNOSÆ.
Ovary superior.	
Carpels three or more.	POLYCARPOSÆ.
Carpels only two.	
Fruit nucamentaceous.	NUCAMENTOSÆ.
Fruit capsular.	DICARPOSÆ.

The orders are disposed under their several alliances in the following sequences.

Table of Alliances and Orders.

Subclass 1. Polypetalæ.

Group 1. ALBUMINOSÆ.

Alliance 1. Ranales. *Herbaceous plants; either with the carpels more or less distinct, or, if that is not the case, with parietal placentæ.* Ranunculaceæ, Podophylleæ, Papaveraceæ, Fumarieæ, Nymphæaceæ, Hydropeltideæ, Nelumbiaceæ, Cephalotaceæ, Droseraceæ.

Alliance 2. Anonales. *Woody plants, with distinct carpels, which are sometimes confluent. Anther-valves opening longitudinally.* Myristicaceæ, Magnoliaceæ, Winteraceæ, Anonaceæ, Schizandreæ, Dilleniaceæ.

Alliance 3. Umbellales. *Flowers umbellate. Calyx superior. Carpels one-seeded. Stem hollow.* Apiaceæ, Araliaceæ.

Alliance 4. Grossales. *Flowers never in umbels. Calyx superior. Carpels many-seeded. Stem solid.* Grossulaceæ, Escalloniaceæ, Bruniaceæ.

Alliance 5. Berberales. *Anthers bursting by recurved valves.* Berberaceæ.

Alliance 6. Pittosporales. *Calyx inferior. Carpels consolidated; style single.* Vitaceæ, Pittosporaceæ, Olacaceæ, Francoaceæ, Sarraceniaceæ.

Group 2. EPIGYNOSÆ.

Alliance 1. Onagrales. *Corolla not valvate. Placentæ central. Type of flowers binary throughout. Herbs.* Onagraceæ, Circæeæ, Halorageæ, Hydrocaryes.

Alliance 2. Myrtales. *Corolla not valvate. Placentæ central. Type of flowers not binary throughout Shrubs or trees.* Combretaceæ, Alangiaceæ, Rhizophoraceæ, Memecylaceæ, Melastomaceæ, Myrtaceæ, Barringtonieæ, Lecythidaceæ, Philadelphaceæ.

Alliance 3. Cornales. *Corolla valvate.* Hamamelaceæ, Cornaceæ, Helwingiaceæ, Loranthaceæ.

Alliance 4. Cucurbitales. *Placentæ parietal.* Cucurbitaceæ, Loasaceæ, Cactaceæ, Homaliaceæ.

Alliance 5. Ficoidales. *Petals indefinite.* Mesembryaceæ.

Alliance 6. Begoniales. *Flowers unisexual. Placentæ central.* Begoniaceæ.

Group 3. PARIETOSÆ

Alliance 1. Cruciales. *Embryo curved. Albumen none.* Brassicaceæ or Cruciferæ, Capparidaceæ, Resedaceæ.
Alliance 2. Violales. *Embryo straight. Stamens definite; none sterile.* Violaceæ, Sauvagesieæ, Samydaceæ, Moringaceæ, Frankeniaceæ.
Alliance 3. Passionales. *Embryo straight. Stamens definite; the sterile ones in a separate ring.* Passifloraceæ, Papayaceæ, Flacourtiaceæ, Malesherbiaceæ, Turneraceæ.
Alliance 4. Bixales. *Stamens indefinite; sterile none. Leaves dotted.* Bixaceæ.

Group 4. CALYCOSÆ.
Alliance 1. Guttales. *Stamens indefinite. Albumen none. Petals and sepals equal in number.* Clusiaceæ or Guttiferæ, Canelleæ, Rhizobolaceæ, Marcgraaviaceæ, Hypericaceæ, Ochrantheæ.
Alliance 2. Theales. *Stamens indefinite. Albumen none. Petals and sepals unsymmetrical, passing one into the other.* Ternstromiaceæ.
Alliance 3. Acerales. *Stamens definite. Flowers unsymmetrical.* Aceraceæ, Sapindaceæ, Millingtonieæ, Æsculaceæ, Polygalaceæ, Vochyaceæ.
Alliance 4. Cistales. *Flowers symmetrical. Albumen present.* Elatinaceæ, Linaceæ, Hugoniaceæ, Chlenaceæ, Cistaceæ, Reaumuriaceæ.

Group 5. SYNCARPOSÆ.
Alliance 1. Malvales. *Calyx valvate. Carpels* 4 *or more. Stamens monadelphous more or less.* Sterculiaceæ, Malvaceæ, Elæocarpaceæ, Dipteraceæ, Tiliaceæ, Lythraceæ (?)
Alliance 2. Meliales. *Calyx imbricated. Carpels* 4 *or more. Stamens usually monadelphous.* Meliaceæ, Cedrelaceæ, Humiriaceæ, Aurantiaceæ, Spondiaceæ.
Alliance 3. Rhamnales. *Calyx valvate. Carpels fewer than* 4. *Shrubs.* Rhamnaceæ, Chailletiaceæ, Tremandraceæ, Nitrariaceæ, Burseraceæ.
Alliance 4. Euphorbiales. *Calyx imbricated. Carpels fewer than* 4. Euphorbiaceæ, Empetraceæ, Stackhousiaceæ, Fouquieraceæ, Celastraceæ, Hippocrateæ, Trigonieæ, Staphyleaceæ, Malpighiaceæ, Erythroxyleæ.
Alliance 5. Silenales. *Embryo rolled round albumen; or joints of stem tumid; or leaves minute and scale-like.* Silenaceæ, Alsinaceæ, Tamaricaceæ (?), Illecebraceæ.

Group 6. GYNOBASEOSÆ.
Alliance 1. Rutales. *Style single, or leaves marked with pellucid dots.* Ochnaceæ, Simarubaceæ, Rutaceæ, Zygophyllaceæ, Xanthoxylaceæ.
Alliance 2. Geraniales. *Styles distinct. Ovary consolidated. Stamens hypogynous.* Geraniaceæ, Vivianiaceæ, Balsaminaceæ, Tropæoleæ, Oxalidaceæ, Ledocarpeæ.
Alliance 3. Coriales. *Styles and carpels both distinct.* Coriariaceæ, Surianaceæ.
Alliance 4. Flörkeales. *Styles single. Fruit lobed. Stamens perigynous.* Limnanthaceæ.

Group 7. APOCARPOSÆ.
Alliance 1. Rosales. *Albumen wholly absent.* Rosaceæ, Pomeæ, Amygdaleæ, Sanguisorbeæ, Fabaceæ or Leguminosæ, Cæsalpinieæ, Mimoseæ, Connaraceæ, Chrysobalanaceæ, Calycanthaceæ.
Alliance 2. Saxales. *Carpels two, diverging at the end, many-seeded. Albumen present.* Baueraceæ, Cunoniaceæ, Saxifragaceæ.
Alliance 3. Crassales. *Carpels several, distinct, continuous with the styles. Seeds indefinite. Albumen.* Crassulaceæ.
Alliance 4. Balsamales. *Carpels neither two, nor divergent, nor numerous, with hypogynous scales. Leaves and bark balsamic.* Amyridaceæ, Anacardiaceæ.

Sub-class 2. Incompletæ.

Group 1. RECTEMBRYOSÆ.
Alliance 1. Amentales. *Catkins. Carpels two or more, combined. Trees or shrubs.* Corylaceæ or Cupuliferæ, Betulaceæ, Scepaceæ.
Alliance 2. Urticales. *Carpels solitary or syncarpous. Stems continuous, without sheaths. Never a cupule.* Garryaceæ, Helwingiaceæ, Trewiaceæ, Urticaceæ, Ceratophylleæ, Ulmaceæ, Stilaginaceæ, Myricaceæ, Juglandaceæ.
Alliance 3. Casuarales. *Carpels solitary. Stems jointed and with sheaths.* Casuaraceæ.
Alliance 4. Datiscales. *Carpels several. Seeds numerous. Leaves alternate.* Datiscaceæ, Lacistemaceæ.

Group 2. ACHLAMYDOSÆ.
Alliance 1. Piperales. *Carpels solitary or distinct. Flowers in spikes. Embryo minute, in the base of fleshy albumen.* Chloranthaceæ, Saururaceæ, Piperaceæ.
Alliance 2. Salicales. *Flowers amentaceous. Fruit mostly many-seeded; when one-seeded, in globular heads.* Salicaceæ, Platanaceæ, Balsamaceæ.
Alliance 3. Monimiales. *Flowers within an involucre. Sexes distinct.* Monimiaceæ, Atherospermaceæ.
Alliance 4. Podostemales. *Flowers solitary. Carpels two or three, combined. Seeds numerous and minute.* Podostemaceæ.
Alliance 5. Callitrichales. *Carpels several, combined, single-seeded. Floaters.* Callitrichaceæ.

Group 3. TUBIFEROSÆ.
Alliance 1. Santalales. *Calyx superior. Anthers opening longitudinally.* Santalaceæ.
Alliance 2. Daphnales. *Calyx inferior, imbricated. Carpel solitary. Anthers opening longitudinally.* Elæagnaceæ, Thymelaceæ, Hernandiaceæ, Aquilariaceæ.
Alliance 3. Proteales. *Calyx valvate. Stamens opposite its lobes. Fruit simple, follicular.* Proteaceæ.
Alliance 4. Laureales. *Anthers opening by valves. Carpels solitary, superior, or inferior.* Lauraceæ, Illigeraceæ, Cassythaceæ.
Alliance 5. Penæales. *Carpels several. Calyx imbricated or valvate.* Penæaceæ.

Group 4. COLUMNOSÆ.
Alliance 1. Nepenthales. *Diœcious. Ovary superior.* Nepenthaceæ.
Alliance 2. Aristolochiales. *Hermaphrodite. Ovary inferior.* Aristolochiaceæ.

Group 5. CURVEMBRYOSÆ.
Alliance 1. Chenopodiales. *Albumen. Radicle next the hilum.* Amarantaceæ, Chenopodiaceæ, Tetragoniaceæ, Phytolaccaceæ.
Alliance 2. Polygonales. *Albumen. Radicle remote from hilum.* Polygonaceæ.
Alliance 3. Petiveriales. *Albumen* 0. *Cotyledons spiral.* Petiveriaceæ.
Alliance 4. Sclerales. *Tube of calyx hardened.* Scleranthaceæ, Nyctaginaceæ.
Alliance 5. Cocculales. *Albumen. Flowers ternary. Calyx in two rows.* Menispermaceæ, Lardizabaleæ.

Sub-class 3. Monopetalæ.

Group 1. POLYCARPOSÆ.
Alliance 1. Brexiales. *Albumen* 0. *Carpels five. Sterile stamens between fertile ones. Seeds indefinite.* Brexiaceæ.
Alliance 2. Ericales. *Anthers porous. Carpels four, five, or more.* Pyrolaceæ, Monotropaceæ, Ericaceæ, Vaccinaceæ, Epacridaceæ.
Alliance 3. Primulales. *Anthers opening longitudinally. Carpels four or five. Fruit often one-celled.* Primulaceæ, Myrsinaceæ, Sapotaceæ, Ebenaceæ, Styraceæ, Aquifoliaceæ.
Alliance 4. Nolanales. *Fruit lobed.* Nolanaceæ.
Alliance 5. Volvales. *Carpels two—four, combined. Anthers never porous.* Convolvulaceæ, Cuscutaceæ, Polemoniaceæ, Diapensiaceæ, Hydroleaceæ.

Group 2. EPIGYNOSÆ.
Alliance 1. Campanales. *Stipules none. Seeds indefinite.* Lobeliaceæ, Campanulaceæ, Sphenocleaceæ?, Belvisiaceæ, Columelliaceæ, Stylidiaceæ.
Alliance 2. Goodeniales. *Stigma with an indusium.* Goodeniaceæ, Scævolaceæ.
Alliance 3. Cinchonales. *Stipules between the leaves.* Cinchonaceæ, Lygodysodeaceæ.
Alliance 4. Capriales. *Stipules none. Leaves opposite. Seeds definite.* Caprifoliaceæ.
Alliance 5. Stellales. *Fruit didymous. Leaves whorled. Stipules none. Stem angular.* Galiaceæ, or Stellatæ.

Group 3. AGGREGOSÆ.
Alliance 1. Asterales or Compositæ. *Anthers syngenesious. Ovary inferior.* Calyceraceæ, Mutisiaceæ, Cichoraceæ, Asteraceæ, Cynaraceæ.

Alliance 2. Dipsales. *Anthers distinct. Ovary inferior.* Dipsaceæ, Valerianaceæ.

Alliance 3. Brunoniales. *Ovary superior. Stigma with an indusium.* Brunoniaceæ.

Alliance 4. Plantales. *Ovary superior. Stigma naked. Style single.* Plantaginaceæ, Globulariaceæ, Salvadoraceæ.

Alliance 5. Plumbales. *Ovary superior. Stigmas naked. Styles five.* Plumbaginaceæ.

Group 4. NUCAMENTOSÆ.

Alliance 1. Phaceliales. *Fruit capsular. Inflorescence gyrate.* Hydrophyllaceæ.

Alliance 2. Echiales. *Fruit nucamentaceous. Inflorescence gyrate. Flowers symmetrical.* Cordiaceæ, Ehretiaceæ, Boraginaceæ.

Alliance 3. Labiales. *Fruit nucamentaceous. Flowers unsymmetrical.* Lamiaceæ or Labiatæ, Verbenaceæ, Myoporaceæ, Selaginaceæ, Stilbaceæ.

Group 5. DICARPOSÆ.

Alliance 1. Bignoniales. *Flowers didynamous. Seeds winged. Albumen none. Calyx complete.* Pedaliaceæ, Bignoniaceæ, Cyrtandraceæ.

Alliance 2. Acanthales. *Flowers didynamous. Seeds adhering to hooks, not winged. Albumen none. Calyx dislocated.* Acanthaceæ.

Alliance 3. Lentibales. *Flowers subdidynamous. Fruit with a free central placenta.* Lentibulaceæ.

Alliance 4. Scrophulales. *Flowers didynamous. Albumen. Placenta parallel with axis.* Gesneraceæ, Orobanchaceæ, Scrophulariaceæ.

Alliance 5. Solanaceæ. *Flowers symmetrical. Albumen. Placenta parallel with the axis.* Solanaceæ, Cestraceæ.

Alliance 6. Gentianales. *Flowers symmetrical, tetrandrous or pentandrous. Placenta perpendicular to axis. Seeds often winged. Leaves opposite.* Gentianaceæ, Spigeliaceæ, Apocynaceæ, Asclepiadaceæ.

Alliance 7. Loganiales. *Flowers unsymmetrical. Stamens never two. Leaves always opposite.* Loganiaceæ, Potaliaceæ.

Alliance 8. Oleaceæ. *Flowers regular, unsymmetrical, diandrous.* Oleaceæ, Jasminaceæ.

We shall not be restrained by false delicacy from criticising this arrangement freely, with reference to its merits as well as its demerits. We will therefore at once say, that in several respects it is a decided advance in the grouping of the orders. By abandoning the artificial distinction of perigynous and hypogynous insertion, many orders naturally allied are brought into contact. The great mass of Polypetalous Exogens is analysed with tolerable precision; a great many of the alliances are, as far as we can discover, unobjectionable; and we can state, from the experience of four years' personal use, that the scheme is of great utility to students, in consequence of the power it gives them of combining the orders. The albuminous group in particular, although incompletely made out, may be regarded as an important elimination of orders which often had no obvious relation to any with which they were previously associated. It cannot be considered otherwise than a striking physiological peculiarity, that while the greater number of Exogens have an embryo so robust as to be able to spring at once into existence, and from the very beginning of its life capable of trusting to the atmosphere and the earth for its support, there should be others, and many of them among the most highly organized races, which are so feeble and puny in the beginning as to require from nature a large and abundant store of nutritive matter upon which they may feed until strong enough to contend with the elements among which they must eventually live. These latter form the albuminous group. Albumen occurs very often in other groups; but in such small quantity that it may be regarded as a mere residuum of the nutrient mucilage in which the embryo was originally developed, rather than a store of food provided for the young plant when it enters upon its first stage of growth. Among the former the presence or absence of albumen is of little or no consequence; Fabaceæ for example, and other equally well defined groups, possess it in some species, and want it in others. But in the orders collected in the albuminous group, its presence and its great disproportion to the embryo are identified with the reproduction of the species, and there is no instance known of its absence, except in Nelumbiaceæ, in which, if they really belong to the group, it may be supposed that the usual function of the albumen is performed by the excessively thickened cotyledons.

But, on the other hand, this system has defects in abundance; so many indeed, that we should say they outweighed its advantages, if they were not fully participated in by all other similar schemes; from a respect for which they have indeed been to a great extent produced. Among minor blemishes may be named the artificial collocation of the genera in some of the alliances, as, for example, the Passional, the Silenal, the Euphorbial, and the Primulal. In the next place, the alliances are excessively multiplied; as in the case of the Cinchonal, Caprial, and Stellal, of the Chenopodial, Petiverial, and Scleral, or of the Geranial and the Flörkeal; this however is a fault on the right side. Of much more consequence is the indefinite character of the Parietous and Gynobaseous groups. The first depends upon a distinction which sometimes exists in the fruit and not in the ovary of the same plant, and which may be destroyed by either the contraction or extension, in a slight degree, of the dissepiments: moreover, the orders collected under it, although to a certain extent naturally combined, yet in other instances, as Bixaceæ, Turneraceæ, Moringaceæ, and the whole Crucial alliance, agree less with each other than with other parts of the system. The Gynobaseous group is much more natural; that indeed is its merit; but the gynobasic character, strongly marked as it is in Geraniaceæ and many of the Rutal alliance, is, it must be confessed, too feeble to deserve to be considered of more than very subordinate importance; in fact, many of the Syncarpous group are gynobasic—Malva, for example. Then, among Monopetalæ, the Dicarpous and Nucamentous groups are not distinguishable, and should have been combined; each however is natural as far as it goes.

The great vice of the arrangement however is that which it owes to the adoption of the old practice of considering Polypetalæ, Monopetalæ, and Apetalæ, fundamental divisions. Every systematical writer at all known, down to the present time, has adopted them; so that their value has become a matter of prejudice, which it will be no easy task to remove from the minds of those who have all their lives been accustomed to look at botanical classifications in one and the same point of view. We will nevertheless attempt to show, firstly, that these divisions are essentially bad; and secondly, that a great advantage will be derived from their rejection. The Monopetalous sub-class depends entirely upon the circumstance of the petals adhering to each other by their edge; it has no accessory characters whatever to sustain it. Now the partial adhesion of contiguous organs is of no greater than ordinal importance when it takes place in other parts of the fructification, and is often not of so much. The sepals adhere or remain separate in the very same natural order, Urticaceæ and Chenopodiaceæ for example. The stamens adhere into a tube, and this sometimes gives a character to certain orders, but more often is a mere distinction of genera, as in Euphorbiaceæ, Iridaceæ, Aristolochiaceæ, &c. When the carpels unite and form a multiplex fruit, the ovaries, style, and stigma, being altogether consolidated, that character becomes of considerable value as contrasted with the complete or partial separation of the carpels, because it is found constant; and hence it has been employed by us as a distinction of a portion of the group of Polypetalæ. But we are persuaded that we have assigned it too high a value, and that it is only one degree better than an ordinal distinction. It is therefore improbable that the adhesion of the petals, organs not even essential to the fructification, but which may be wholly absent without the great functions of impregnation and reproduction being interfered with, should be of greater importance. The monopetalous corolla is not considered of any value in Endogens, even as an ordinal character, and nothing can justify our considering it of primary value among Exogens, except the constant and unvarying existence of that character throughout certain natural orders more nearly related to each other than to anything else. It will be found however upon strict inquiry, firstly, that the character is anything but constant, except in a portion of the Monopetalous sub-class; and secondly, that it combines dissimilar orders, separating them widely from their true affinities.

That the Monopetalous character is not constant hardly requires proof, so notorious is its instability. Pyrolaceæ, Monotropaceæ, Ericaceæ, Myrsinaceæ, Lobeliaceæ, Campanulaceæ, Plumbaginaceæ, and Oleaceæ, all offer instances of the polypetalous structure; and some Primulaceæ, Ole-

aceæ, and Monotropaceæ, are even apetalous; while on the other hand Rutaceæ, Anonaceæ, Stackhousiaceæ, Fouquieraceæ, Crassulaceæ, Loranthaceæ, Cucurbitaceæ, Cactaceæ, Papayaceæ, and many other natural orders, stationed in Polypetalæ, because of their affinity, are either partially or wholly Monopetalous. The Monopetalous character cannot then be defended because of its stability. Moreover, nothing can well be more arbitrary than the language of botanists in speaking of the corolla. In Delphinium, Trifolium, and many other plants, the corolla has all its petals in a state of adhesion; the same thing occurs in Loranthaceæ, and yet these are called Polypetalous. Still more strange is it that Malvaceæ, which have the petals adhering to the tube of the stamens, should be called Polypetalous, while Styraceæ, having precisely the same organization, are accounted Monopetalous.

It will also be found that the Monopetalous character is equally objectionable as a means of combining similar natural orders. So far is it, except in the case of the Dicarpous and Nucamentous groups, from complying with the conditions to be required of all characters employed for purposes of co-ordination, namely, combining genera more nearly allied to each other than to any thing else, that in fact it disunites plants closely akin, and interrupts series that would be otherwise as complete as series can be in the arrangement of living beings; as will be apparent from the following statement.

Pyrolaceæ and Monotropaceæ have a minute embryo, a large mass of albumen, a tendency to become leafless and parasitical, and in all their habits are at variance with the rest of Ericales.————The latter have no direct connection with any other Monopetalous order, but have all their affinities turning towards Rutaceæ, as is proved by Correa, Phebalium, and other genera.————Primulaceæ and Myrsinaceæ, with their large horny albumen, approach Cinchonales, and together with that, the Caprial and the Stellal alliances seem rather to belong to the Albuminous group.————Ebenaceæ and Aquifoliaceæ have an affinity with Myrsinaceæ. Dr. Royle has pointed out a connection between Ebenaceæ and Clusiaceæ; Adolphe Brongniart has shown that Aquifoliaceæ must stand near Ebenaceæ; and with regard to Styraceæ, Jussieu actually referred them to the polypetalous Meliaceæ, and De Candolle considers them nearly akin to Ternstromiaceæ.————Whatever the affinity of the Nolanal and Volval alliances may be, it is clear that in taking away the orders already mentioned, they will remain isolated among orders to which they have no direct relation. It will be seen that they fall naturally into their places in a re-distribution of Exogens upon other principles.————Columelliaceæ must be looked upon as a monopetalous form of Onagraceæ, and will connect the Campanal and Goodenial alliances with the series to which Onagraceæ belong.————The Cinchonal, Caprial, and Stellal alliances, which ought to be combined, are so closely united with Apiaceæ among Albuminosæ, that they may be naturally transferred to that group. Even De Candolle has found it necessary to approximate them by stationing Apiaceæ near the end of his polypetalous sub-class, and Cinchonaceæ near the beginning of his Monopetalæ. The connection of Apocynaceæ with these plants is perhaps more apparent than real.————Asterales and Dipsales necessarily follow the affinity of the Campanal alliance. ————The Brunonial, Plantal, and Plumbal alliances may be considered more properly analogous than allied to Asterales, and have no affinity of an obvious kind with any other monopetalous orders.————All the other orders are well combined, with the exception of Orobanchaceæ; the affinity of that order with Scrophulariaceæ and the remainder of the dicarpous group is extremely problematical. It has not, so far as we are aware, been before observed that the carpels in that order are right and left of the axis, and not anterior and posterior; a very important circumstance, which so much weakens its supposed affinity with Scrophulariaceæ as to remove many objections to its separation into a distinct part of the system. But if on the other hand we look to the aristate base of the anthers in Orobanche, the extreme resemblance of that genus to Monotropoceæ in habit, and the remarkable similarity between its placentation and that in the upper half of the ovary of Monotropa, to say nothing of its capitate stigma and calyx, the number of whose parts is at variance with that of the corolla, we incline to think that these two orders are more closely allied than they are usually supposed to be.

With regard to the Apetalous sub-class, it is even more objectionable than the Monopetalous. There is no end to the instances of Polypetalous orders being Apetalous; and in Thymelaceæ, Menispermaceæ, Polygonaceæ, and a few others, the denial of the presence of petals in particular genera is a mere arbitrary use of words. Many Apetalæ appear, in fact, to be imperfect forms of Polypetalous groups, and will naturally arrange themselves in the same series with what may be supposed to be their more perfect types. Piperales seem a degraded state of Anonales, Penæales of Onagrales, Daphnales and their allies of Rhamnales. But a large proportion of the Apetalous orders undoubtedly require to be located separately. They have distinct sexes and a peculiar habit, and must be considered a quite distinct group, as Jussieu originally stated them to be.

Having thus shown how unsatisfactory are the principles hitherto employed for classifying Exogens, we next proceed to show in what way it appears to us they may be arranged in a more natural and precise manner; the Polypetalous, Monopetalous, and Apetalous sub-classes being altogether abandoned.

In the first place, there are the orders whose embryo is, as has already been stated, furnished with an excessive quantity of albumen. This, as a great physiological distinction, may be considered to supersede all others, and to establish an *Albuminous* group.——The remainder consists of orders in which some have the sexes in distinct flowers, others combined with hermaphrodite flowers. We know of no character intimately connected with the reproduction of the species which is upon the whole so important as this; indeed, if it were not for the frequent occurrence of polygamous flowers throughout hermaphrodite orders, we should assign it a higher place than even the albuminous character; but the constant tendency of hermaphrodite flowers to become polygamous leads us necessarily to look upon sexuality as a secondary character only, especially since, if it were taken as a primary one, it would have the unnatural effect of separating Myristicaceæ and Schizandreæ from Anonales. For this reason a *Diclinous* group may be formed, into which nothing should be admitted except plants without any tendency to hermaphroditism.——The hermaphrodite orders may be separated into those with the calyx, corolla, and stamens confluent at the base with each other and with the ovary, that is, having an inferior ovary, and those in which those parts are distinct, either altogether or at least from each other: the former will constitute an *Epigynous* group.——Finally, the remainder of the orders may be divided into those with a monopetalous corolla combined with an ovary upon a binary plan (*Dicarpous*), and those which, if monopetalous, have the ovary simple or complex (*Polycarpous*).

The following table will put this in a clearer point of view.

Albumen extremely abundant; embryo minute	1. ALBUMINOSÆ.
Albumen absent, or in small quantity.	
Sexes in the same flower.	
Ovary inferior. . .	2. EPIGYNOSÆ.
Ovary superior.	
Flowers, if monopetalous, not with a bicarpellary ovary .	3. POLYCARPOSÆ.
Flowers monopetalous, with a bicarpellary ovary . .	4. DICARPOSÆ.
Sexes in different flowers • .	5. DICLINOSÆ.

Each of these groups will form a series by itself, the sequence of which ought to be natural, and to exhibit various lateral analogies with other groups. Possibly each group will comprehend within itself a maximum, a medium, and a minimum type of structure, the second being typical of the group, the first an exaggerated form of it, and the last a degraded form. This at least may be traced in the classes of Exogens, Endogens, and Acrogens; it frequently occurs in natural orders, is not uncommon in genera, and therefore may be expected in groups.

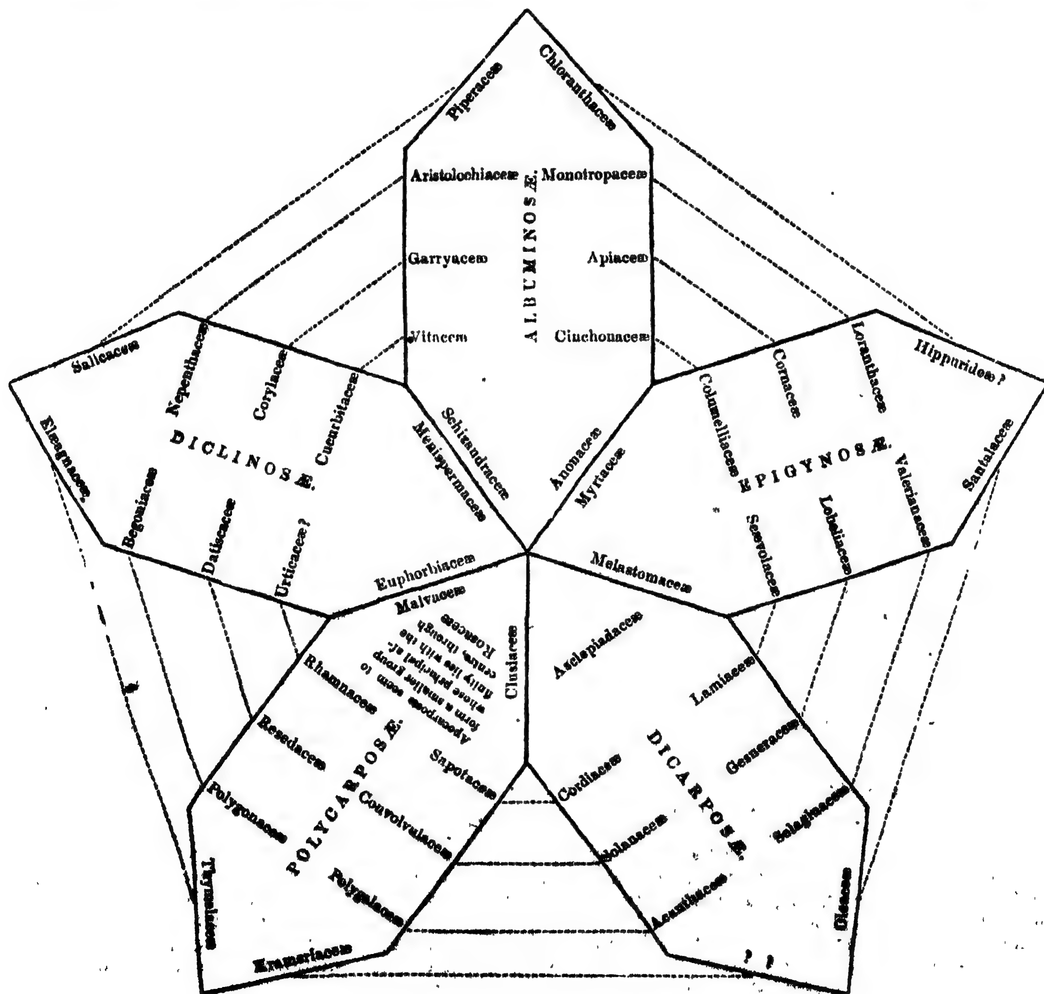
It is scarcely possible to undertake a more difficult task than that of disentangling and settling the perplexed and complicated web of natural affinities. Every order may be compared with so many other orders in one respect or another, and the value of characters is, as far as we yet know, so very unsettled, that the most skilful and experienced botanist is perpetually embarrassed at determining the fundamental question of which orders have more relation to each other than to anything else. Viewed in one direction, the subject has one aspect, from another position it often seems quite changed. We have no certain test by

which affinity and analogy can be distinguished; and moreover, it is a most difficult thing to divest the mind of the prejudices that inevitably result from a long habit of thinking erroneously.

Nevertheless, in spite of all such obstacles, Truth is surely to be found; and when found, she will prove most richly worth the labour bestowed in searching for her. One great and immediate advantage that may be expected from a discovery of the true method of arranging exogens according to their real affinities will be a great simplification of the subject; and the extent to which this seems to be effected by the plan now proposed is much in favour of its being at least an approach to a discovery of the secret we are in search of. We will not here undertake to re-arrange all the orders already named according to the method now suggested; but the following table will serve to show that each of the five groups now proposed does exhibit distinct lateral analogies between its own series of orders and those of the groups standing next it.

ALBUMINOSÆ.	EPIGYNOSÆ.	DICARPOSÆ.	POLYCARPOSÆ.	DICLINOSÆ.
Anonaceæ	Myrtaceæ		Clusiaceæ	Menispermaceæ
Schizandraceæ	Melastomaceæ	Asclepiadaceæ	Malvaceæ	Euphorbiaceæ
Cinchonaceæ	Columelliaceæ	Cordiaceæ	Sapotaceæ	Cucurbitaceæ
Apiaceæ	Cornaceæ	Solanaceæ	Convolvulaceæ	Corylaceæ
Vitaceæ	Scævolaceæ	Lamiaceæ	Rhamnaceæ	Urticaceæ?
Monotropaceæ	Loranthaceæ	Acanthaceæ	Polygalaceæ	Nepenthaceæ
Garryaceæ	Lobeliaceæ	Gesneraceæ	Resedaceæ	Datiscaceæ?
Aristolochiaceæ	Valerianaceæ	Selaginaceæ	Polygonaceæ	Begoniaceæ
Piperaceæ	Santalaceæ	Oleaceæ	Thymelaceæ	Elæagnaceæ
Chloranthaceæ	Hippurideæ	?	Kramericeæ?	Salicaceæ.

Of course it is to be supposed that many of the orders or alliances introduced into this table are separated from those now placed next them by many, sometimes a great number of intervening orders, and that in fact what stands on paper as a series is an intricate combination of crossing and interfering analogies and affinities, which could only be expressed correctly by rays diverging from a common centre and intersecting or striking other rays of other centres, the points of intersection being what we call analogies. No diagram can exhibit these otherwise than very imperfectly; nevertheless, as it does show them better than mere lines of words, we have introduced into the following plan the analogous orders comprehended in the preceding table. The orders collected around the centre are all in close relation, and exhibit in their own series a degree of organization equivalent to what occurs at the same point in other series; those at the points of the rays of the diagram correspond in like manner with the other points; and the orders stationed along the sides of each ray are places at which the rays are laterally analogous; while the orders themselves are in direct affinity with each other through other orders not included in the diagram.



That these groups are all perfect in themselves, or nearly so, is sufficiently proved by Albuminosæ, the sequence of whose orders may be expressed as follows; the orders included in the diagram being marked with *.

1 *Anonales.* Magnoliaceæ
Winteraceæ
Dilleniaceæ
Berberaceæ
*Anonaceæ
Menispermaceæ
Atherospermaceæ
Myristicaceæ
*Schizandraceæ

2 *Ranales.* Nymphæaceæ
Hydropeltideæ
Nelumbiaceæ
Ranunculaceæ
— Podophylleæ
Papaveraceæ
— Fumarieæ
Francoaceæ (?)
Sarraceniaceæ
Cephalotaceæ
Droseraceæ

3 *Primulales.* Primulaceæ
Myrsinaceæ
Ebenaceæ?
Aquifoliaceæ?

4 *Gentianales.* Apocynaceæ
Spigeliaceæ
Gentianaceæ

5 *Loganiales.* Loganiaceæ
Potaliaceæ

6 *Cinchonales.*	Caprifoliaceæ	10 *Lathræales.*	Pyrolaceæ
	*Cinchonaceæ		*Monotropaceæ
	Lygodysodeaceæ (?)		Orobanchaceæ
	Galiaceæ	?	?
7 *Umbellales.*	*Apiaceæ	11 . . .	*Garryaceæ
	Araliaceæ	12 . . .	*Aristolochiaceæ
8 *Pittosporales.*	*Vitaceæ		
	Olacaceæ	13 *Piperales.*	*Piperaceæ
	Pittosporaceæ		Saururaceæ
9 *Grossales.* .	Grossulaceæ		*Chloranthaceæ.
	Bruniaceæ		
	Escalloniaceæ		

If we should find it necessary to recur to this subject, we shall do so when speaking of NATURAL ORDERS.

EXORCISM, (*ἐξορκισμός*) the form of adjuration, or charging upon oath, by which evil and malignant spirits are subjected to command, or driven away: from the Greek *exorkizen* (*ἐξορκίζειν*). See Joannis Wieri, *De Præstigiis Dæmonum et incantationibus ac veneficiis Libri* v., 8vo., Bas. 1566 and 1583; and the *Manuale Exorcismorum*, by Maximilian ab Eynatten, 8vo., Antw., 1619.

EXORHIZÆ. [EXOGENS.]

EXOTERIC and **ESOTERIC** (*ἐξωτερικός* and *ἐσωτερικός*), literally 'external' and 'internal,' were two terms used in reference to the writings and doctrines of many of the antient Greek philosophers. The general distinction between the classes of works called by these respective names is this: the 'exoteric' were those writings which were in a more popular form; the 'esoteric' those which were written in a scientific and more exact form. The 'esoteric' would of course contain a true investigation of principles as then understood; the 'exoteric' would exhibit philosophical systems in such a form as the mass were able and willing to receive. The 'exoteric' writings consequently accommodated themselves to popular prejudices and superstitions, this being the only safe way in which a certain amount of philosophical truth could be conveyed to the vulgar. The 'esoteric' writings and doctrines were reserved for those who were far enough advanced to understand them, and to form a just notion as to the prevalent false opinions of the mass of the people. It is important to bear in mind this distinction between 'exoteric' and 'esoteric' doctrines in forming our judgment of the character and writings of the antient philosophers. [ARISTOTLE, p. 334.]

EXPANSION. [HEAT.]

EXPECTATION OF LIFE, a term applied to the mean or average duration of the life of individuals of any given age. [LIFE, MEAN DURATION OF.]

EXPECTORANTS (from *ex*, out of, and *pectus*, the chest) are medicinal agents, which, in certain conditions of the system, will, either by promoting or repressing the secretion of the air-passages and of the lungs, facilitate its expulsion. The articles which bear this name differ considerably as to the means by which this end is accomplished. They are chiefly derived from the vegetable kingdom, some being gum-resins, or balsams, of a stimulating quality, while others are possessed of nauseating or sedative properties; vapours also are expectorants, and may be either simple, as that of warm water, or medicated with different impregnations. Vapours alone reach the organs to be affected, and are therefore the only *direct* expectorants; the others being taken into the stomach must operate by sympathy or some other obscure agency.

From the differences in the nature of the substances regarded as expectorants it is clear that they must operate in a very different manner, according to the state of the system, the pathological condition of the lungs, and the stage of the complaint. Great care is necessary in selecting the particular agent suited to each case, and in no set of diseases are greater errors committed by unprofessional persons by an injudicious employment of these agents, than in those of the lungs, from common colds to the more serious and fatal affections of these vital organs. The slight nature of many of the common maladies of the throat and lungs, and the fatality of consumption, which is generally though most erroneously regarded as an affection of the lungs themselves, while it is truly an affection of the whole constitution, have led to a degree of interference with the treatment of diseases of these organs not attempted in any other cases, as the multitude of popular remedies for *coughs*, *colds*, and *consumptions*, attest.

Those who regard their health and wish to prolong their lives should beware of tampering with such important organs by means of any of the numerous *nostrums* vended to the public. To treat satisfactorily the diseases of the lungs it is necessary to know their structure, and the relations they have to the other parts of the body. The bronchia (or air-passages) and air-cells of the lungs are lined by a *mucous* membrane, and have of consequence relations of sympathy with the skin and intestinal canal more close than with any other part of the system. A vicarious discharge or secretion is thrown off by the internal (pneumogastric) or external surface (*i. e.* the skin), and any considerable diminution of this discharge on the part of either is in some degree compensated for by augmented secretion of the other. Hence when the insensible perspiration of the skin is suddenly checked by exposure to cold, a double duty is thrown upon the internal membrane, sometimes of the intestines, when diarrhœa may result, sometimes of the lungs, when catarrh (common cold), or pneumonia may ensue. This fact enables us both to comprehend the cause of some of the diseases in which expectorants are proper, and their mode of aiding the cure.

A certain exhalation from the internal surface of the lungs and air-passages constantly goes on in a state of health—any considerable diminution or augmentation of this secretion may require the assistance of medicines to raise it to the proper quantity in the one instance, or to evacuate the superfluity and repress the tendency to its excessive formation in the other. The chief causes which lead to diminished secretion are inflammation and spasm—hence at the commencement of inflammatory affections of the air-passages and of the lungs the inner membrane is dry, and by the stethoscope what is called the crepitating *râle* is heard; in asthma and hooping-cough, while the spasm lasts, there is an absence of secretion, which becomes abundant when the spasm yields.

To obviate these states very different means must be employed from what are necessary in the later stages of an inflammatory affection, or where there was extreme relaxation of the vessels of the lungs, and the exhaled fluid redundant in quantity. One of the terminations of inflammation being by effusion, when the increased action of the vessels has lasted for some time a state of the lungs occurs which is precisely the reverse of what it was before, and an extreme quantity of mucus obstructs the access of air to the blood circulating through the cells of the lungs: if this continue to accumulate, suffocation must follow. Too great an accumulation sometimes takes place, especially in elderly people, not from excessive secretion but from deficient absorption.

These are a few of the different states for which expectorants are used, but much circumspection is required to accommodate the means to the end. Where there is decided inflammation the best expectorants are those which lessen the inflammatory state, such as venesection and nauseating doses of tartrate of antimony or of ipecacuanha, and the inhalation of the vapour of warm water, simple or medicated, by means of Mudge's Inhaler. But as the use of any such instrument requires considerable exertion of the respiratory organs, where the inflammation is violent it is inadmissible, as the lungs must be kept in as tranquil a state as possible; but the head may be held over a basin of warm water, the vapour of which will be received by the lungs in the ordinary course of respiration.

When the inflammation has subsided, the more stimulating expectorants may be used. Where there is first spasm hindering secretion, and ultimately an excessive exhalation which must be cleared away, a combination of a sedative or antispasmodic medicine with the expectorant is best.

These are the principles which should regulate our choice in the more acute affections of the chest; but as no set of organs are so subject to chronic disorders as the lungs and their appendages, we frequently have recourse to expectorants to alleviate many of the symptoms attendant on them.

Lessening the tendency of blood towards the lungs, and directing it more towards the skin, is of service both in acute and chronic affections of the chest. Hence bathing the feet in warm water on the first feeling of an attack of cold, followed by antimonials or other diaphoretics, is of much utility, if the patient go into a warm bed immediately; while, on the same principle, the use of flannel next the skin is the best preventive, and is indispensable for all delicate persons, particularly if predisposed to diseases of the lungs.

EXPLANARIA. [MADREPHYLLICEA.]

EXPONENT; EXPONENTS, NOTATION OF. In the algebraical expression a^x, x is called the exponent of a. If we were strictly to preserve the most antient meaning of the term, x would be called the exponent of the whole symbol a^x: but it is usual to call x the exponent of a, and the logarithm of a^x.

From the time of Descartes it has been usual to employ exponents in abbreviation of repeated symbols of multiplication: but this was only the beginning of a series of extensions which have made the theory of exponents a fundamental part of analysis. Beginning with the simple substitution of a^2 instead of $a \times a$, a^3 instead of $a \times a \times a$, and so on, we have a succession of new symbols suggested by the processes of algebra, namely, that a^1 should stand for a, a^0 for unity, a^{-x} for the reciprocal of a^x, and $a^{\frac{m}{n}}$ for the nth root of the mth power of a. These conventions being made, the common algebraical theory of exponents is complete; and the student will find in works on algebra an account of the manner in which the necessity for these extensions appears. The theory of logarithms flows naturally from this notation and the binomial theorem.

Looking at the notation of exponents in another point of view, we see that a^1, or a, signifying the performance of a certain operation on the unit, a^2, or aa, signifies the repetition of the same operation upon a itself; a^3 denotes the repetition of the same operation upon a^2, and so on. Hence by analogy, whenever, in the higher parts of analysis, ϕx signifies an operation performed upon x, $\phi^2 x$ signifies the repetition of the operation upon ϕx. Thus if ϕx signify $1 + 2x$, then

$$\phi^2 x \quad \text{is} \quad 1+2\ (1+2x) \quad \text{or} \quad 3+4x.$$
$$\phi^3 x \quad \text{is} \quad 1+2\ (3+4x) \quad \text{or} \quad 7+8x, \text{ \&c.}$$

It appears by reasoning analogous to that which establishes the meaning of exponents in algebra, that $\phi^0 x$ must stand for x itself. Also $\phi^{-1} x$ must signify the operation inverse to (or which destroys the effect of) ϕx; thus if ϕx signify x^2, $\phi^{-1} x$ must be $\sqrt{x}$. Also $\phi^{\frac{m}{n}}\, x$ means that operation which performed n times in succession, gives the same result as ϕx performed m times.

The Differential Calculus and the Calculus of Differences furnish striking examples of the notation of exponents. As soon as the student arrives at the higher parts of these subjects, he should pay particular attention to the structure of the notation, and in particular to the meaning of those theorems in which the symbols of operation are separated from those of quantity.

EXPORTS. [IMPORTS AND EXPORTS.]

EXTENT (Lat. *extenta*) is a writ of execution (sometimes called an *extendi facias*), which is directed to the sheriff against the body, lands, and goods, or the lands only, of a debtor; and it is also used as signifying the act of the sheriff or officer upon the writ itself.

The king by antient prerogative is entitled to this writ, either in chief or in aid for the purpose of obtaining satisfaction of debts originally due to him or assigned to the crown. *The writ of extent in chief* is an adverse proceeding by the king for the recovery of his own debt, and in which he is the real plaintiff. This writ is issued out of the equity side of the Court of Exchequer; and the sheriff, for the purpose of executing it, may break open the defendant's doors, when purposely closed, either to arrest him or to take his goods. If however the defendant cannot be found, or is not meant to be arrested, the sheriff impanels a jury to inquire as to the debtor's lands and tenements, goods and chattels; and after the inquisition is made, the lands then become bound to the crown until the debt is satisfied. *The writ of extent in aid* is also sued out at the instance and for the benefit of the crown against the debtor of a crown debtor: in this proceeding the king is the nominal plaintiff only. This writ is in effect an extent in the second degree, and in order to obtain it an extent *pro forma* is sued out against the debtor to the crown, upon which an inquisition is taken; and if it be thereupon found that another person is indebted to him, the Court of Exchequer, on an affidavit to that effect, and also to the effect that the crown debt is in danger, will grant a fiat or warrant for an immediate extent in aid. Under this writ, the body of the defendant may in strictness be taken in execution as well as his lands, tenements, goods, and chattels, &c.; but where there are effects sufficient to satisfy the debt, the court seems generally disposed to give the defendant his discharge.

On the return of the writ of extent in chief or in aid to the court from whence they are issued, an order is endorsed on the back of it, 'that if no one shall appear and claim the property of the goods, &c. mentioned in the inquisition, on or before that day se'nnight, a writ of venditioni exponas shall issue to sell the same.' If the produce of the goods sold be not sufficient to pay the debt, the court will make an order for the sale of the debtor's lands under the 25th George III., c. 35.

There are various means of resisting the execution of the above writs, on the ground of informality or want of title in the crown; which may be referred to in the second volume of Mr. Tidd's work on the practice of the superior courts.

The writ of extent for the subject is founded upon a recognizance at common law or by statute, or upon a judgment in an action of debt against an heir, on the obligation of his ancestor. It is very similar in its effects and mode of execution to the other writs of extent already specified. [ELEGIT.]

When lands are delivered over to a creditor upon an extent, a reasonable but not the real value is set upon them; and the effect is the same as if the creditor took a lease of the lands until his debt is satisfied. The time during which the creditor will hold the lands will of course be determined by a comparison of the value set on the lands with the amount of the debt. (Coke *on Littleton*; Tidd's *Practice*; Blackstone's *Commentaries*.)

EXTORTION; any oppression under colour or pretence of right. In its more common acceptation, extortion is applied to the unlawful taking by an officer, under colour of his office, of any money or valuable thing where none at all is due, or not so much is due, or before it is due. The officer is punished by fine and imprisonment, and by removal from office. Where no fee at all is due, the offence is more properly exaction—the distinction is thus made in the *Termes de la Ley*: 'Extortion is where an officer demandeth and wresteth a greater sum or reward than his just fee; and exaction is where an officer or other man demandeth and wresteth a fee or reward where no fee or reward is due at all.'

EXTRACTION OF ROOTS. [INVOLUTION AND EVOLUTION.]

EXTRACTS are medicinal preparations of vegetable principles, obtained in various ways. Sometimes they are merely the juices expressed from the fresh plants, brought by careful evaporation to the consistence of honey, and then more properly denominated *inspissated juices;* at other times they consist of certain principles of the fresh or dried plant extracted by some menstruum in which they are soluble, such as water, proof spirit, or vinegar, and afterwards evaporated, as in the former case. According to the nature of the menstruum employed the extract is called *watery*, *alcoholic*, or *acetous*. The objects proposed in such proceedings are, to ensure the preservation of the active principles of the plant by removing the fluid in which they are dissolved, or the materials with which they are associated, that have a greater tendency to fermentation or putrefaction; to bring the valuable portion into the smallest possible compass; and to facilitate the administration of them by thus rendering them capable of being made into pills, &c.

The preparation of extracts requires the greatest care. The plants must be in every respect of the best quality, as regards the place of their growth, season when collected, &c., and the evaporation must be conducted rapidly, yet at a low temperature. Orfila found that the excellence of preparations of this kind was always in the reverse ratio of the temperature employed to form them. Mr. Barry effected a great improvement in the mode of preparing extracts by evaporating *in vacuo*. During the preparation, and especially towards the end of the operation, frequent stirring the contents of the evaporating-pan is necessary to prevent burning or decomposition of any portion of the mass. Extracts may also be formed from dried plants, barks, roots, &c., by reducing them to fine powder and macerating it for 24 or 48 hours in sixteen times its weight of water. In general cold water is now employed, but in some cases it is proper to employ warm. The extract of cinchona, prepared with cold water, is less powerful than that prepared with warm.

Extracts are simple or compound, according as they are prepared from one plant or from several different kinds.

This mode of preparing vegetable principles is generally unsuitable where a volatile oil is the active agent, unless great care and a very low temperature be used.

A well-prepared extract should possess in a great degree the odour, and especially the taste, of the plant from which it is obtained; it should not have either an empyreumatic smell or taste, and it should have a proper and uniform consistence. It is necessary to preserve extracts in a dry situation: to assist in keeping watery extracts, it is customary to sprinkle a little alcohol over the surface before covering them up; but watery extracts, if made with cold water and due care, rarely require this precaution. It is proper to examine the condition of all extracts very frequently, both during very warm and very wet weather: any portion which seems spoiled should be immediately thrown out.

Formerly, from the careless or unskilful mode of their preparation, extracts were the most uncertain and useless form of vegetable remedies; but since competent practical and scientific chemists have given their attention to the subject, they are now, in many instances, the most valuable contributions which chemistry has made to practical medicine.

EXTRAVASATION (*extra*, without, *vas*, a vessel), in medicine, signifies the escape of any of the fluids from its natural reservoir or canal into some neighbouring cavity or texture. The term is nearly synonymous with effusion, but less comprehensive, as it does not include the case of fluids poured out by secretion, such as dropsies, or any of the products of inflammation. It is most commonly employed in designating effusions of blood or of urine; and we shall therefore confine what we have to say on the subject to a brief notice of the principal varieties of these accidents, referring the reader for more complete information to other parts of the work.

Extravasations of blood are always serious and often fatal when the larger vessels and more important organs are concerned in them. Thus if blood escape in consequence of the rupture of an aneurism of the aorta into the bag which encloses the heart, the circulation is immediately arrested, and sudden death ensues. Such an accident is said to be 'an extravasation of blood into or within the pericardium.' [ANEURISM.]

Blood is sometimes driven with great force from a ruptured or wounded artery into the loose spongy substance consisting of connected cells which surrounds and separates the various organs, and is found in great abundance in every part of the body. This is called 'extravasation of blood into the cellular tissue' of the part. In such cases, if the vessel be a large one, the extravasation may be so considerable as to occasion enormous swelling and distension of the contiguous parts; and it may be fatal from the amount of the hæmorrhage, or from pressure upon some vital organ, or from mortification. [HÆMORRHAGE.] This is a frequent source of danger in gunshot wounds. Fractures also are generally followed by considerable effusions of the same kind, which however are soon absorbed, and are not often attended with serious consequences, except in fractures of the skull: in that case they compress the brain, and produce the symptoms of apoplexy. [HEAD, INJURIES OF THE.] The *thrombus*, or swelling beneath the skin, so frequently observed after bleeding from the arm, is also formed by extravasation of blood into the cellular tissue. It arises from the puncture in the skin not corresponding with the opening in the vein, or not being sufficiently large. It soon disperses, and is of little importance. [BLEEDING.] Contusions are likewise followed by extravasation of blood into the cellular tissue under the skin and in the skin itself from the rupture of small vessels; and this is the reason of the dark colour assumed by the bruised parts, which often extends to a considerable distance from them; as in the familiar instance of a black eye. This superficial extravasation is generally called *ecchymosis*, a word of the same import.

Spontaneous extravasations of blood, allied to those last mentioned, frequently take place in the progress of various diseases, of which they may be causes or symptoms. The spots which appear under the skin and beneath the membranes which line the internal cavities and tubes, in plague, typhus fever, sea-scurvy, and other complaints, are of the symptomatic kind; and these as well as the discolorations after contusions are included in the general term *ecchymosis;* they are also known by various other names, as *vibices* (wheals), *petechiæ*, and *purpura*. They are frequently attended with bleeding from the mucous membranes of the intestines and bladder, and of the nose; and they often occur, in the lower extremities especially, when the liver is enlarged, or otherwise diseased. They are supposed in general to indicate a want of tone in the system, and are attributed by some to a *dissolved* and semiputrescent condition of the blood; but they arise in some instances from a plethoric habit, and require bleeding for their cure.

One of the most common causes of apoplexy is an extravasation of blood in the substance of the brain, or between its membranes, from the simultaneous rupture of many minute arteries. It happens for the most part suddenly, when the vessels of the head are preternaturally distended, but yet not without some premonitory signs; and as the affection occurs most frequently at an advanced period of life, when the arterial system in general is disposed to disease, it is probable that the rupture is often preceded by some morbid change which renders the capillary vessels more than usually fragile. [APOPLEXY.] The term *apoplexy* has been extended by modern pathologists to similar extravasations occurring in the texture of other organs besides the brain; it may take place in the liver when the venous system of the abdomen is loaded with blood, and from other causes; and it frequently happens in the lungs when their circulation is either obstructed or too forcibly urged in various diseases of the heart. [HEART.] It likewise happens very commonly in the early stage of consumption, when the body is yet full of blood, and the substance of the lungs is rendered brittle and inelastic by the deposit of tuberculous matter. [PHTHISIS.] When it occurs in the lungs, the injury is attended with *hæmoptysis*, or spitting of blood. In this, as in many extravasations of the same kind, it is probable that the blood is effused rather in consequence of a *rent*, or breach of continuity in the structure concerned, than from what is implied in the common notion of the breaking of a blood-vessel.

The presence of extravasated blood does not in itself produce much irritation, and the coagulum is soon absorbed when the quantity is not very great, and the vital powers are not depressed by concomitant causes. Where pressure is applicable, the absorption is much quickened by a bandage put on after the immediate effects of the injury have subsided, as in sprains and bruises of the limbs: friction and embrocations have the same effect.

Extravasations of urine may take place in consequence of rupture of the bladder or urinary passages from ulceration, mechanical injuries, or any cause that produces distension to a great degree. If the fluid escape into the cavity of the abdomen, the result is uniformly and speedily fatal. If it insinuates itself into the cellular tissue in the neighbourhood of the neck of the bladder or the urethra, the accident is still a very serious one, though it generally admits of cure if the nature of it be immediately recognized. The fluid, which is highly deleterious, must be promptly evacuated by free incisions, and care must be taken to prevent further infiltration. If this be neglected, unhealthy suppuration is sure to take place, accompanied by fever of a typhoid character, and followed by extensive mortification.

The most common causes of infiltration of urine are abscesses of the prostate gland, and neglected or mismanaged strictures; and a very frequent consequence is the establishment of a urinary fistula in the perineum. [URINARY ORGANS.]

It may be remarked that the bile is sometimes extravasated in the same way from the gall-ducts or bladder. If it escape into the abdomen, it is followed by a similar fatal result from inflammation of the *peritoneum*. [ABDOMEN; CALCULI, BILIARY.]

EXUMA. [BAHAMAS.]

EYCK, JOHN VAN, the improver and supposed inventor of oil-painting, sometimes called John of Bruges from his having settled at that place, was born at Maaseyck as is generally said, in 1370, and studied with his elder brother Hubert (born in 1366), an artist of reputation, but now rarely mentioned except in conjunction with himself. There are however some reasons for supposing John to have been born much later than 1370. There are very contradictory accounts of his merits. Some extol him as a various and expressive designer; others say he had no claim to repute, except as a colourist; others again found his whole fame upon his discovery of the art of painting in

oil; and it was concluded by most, till lately, chiefly on the authority of Sir Joshua Reynolds, that Raspe the antiquary, in a treatise on the question, had deprived him even of this last remnant of his renown. Raspe certainly proved that he did not make the discovery; but he surmised, what Lanzi has since shown to be the probable conclusion, that although Van Eyck did not invent, he greatly improved the art of oil-painting, and brought it into general use. This was effected by his discovering the means of giving consistency to colours without drying them in the sun, and of adding to them clearness and brilliancy by a water-proof varnish. After having long resided in the rich and flourishing city of Bruges, the two brothers removed about 1420 to Ghent, where their greatest and most renowned work, the adoration of the Lamb, was painted between the years 1420 and 1432. Some say it was painted for Iodocus Vyts, a rich citizen of Ghent, while others affirm that it was by order of Philip, duke of Burgundy, count of Flanders, who came to the government in 1420. It is certain however that John Van Eyck was long attached to the brilliant court of Philip. This often described picture contains no fewer than 330 figures. It is with folding-doors, filling in all twelve panels. It was so highly prized that it was shown only on particular occasions. Philip II., king of Spain, thought of removing it to Madrid, but was prevailed upon to content himself with a copy by Michael Coxis of Malines. This copy has in our days found its way back to the Netherlands, and thence, as it should seem, to Berlin. The fate of the original is remarkable, and much to be regretted. It remained entire till the French, getting possession of Belgium, of course turned their eyes to so rich a prize. The clergy of the cathedral of St. Bavon succeeded however in concealing eight of the twelve panels, so that only four were taken to Paris, whence they were brought back in 1815. The clergy have since sold six of the panels which were concealed, and they are now in the Royal Museum at Berlin, where they are united with a part of the copy made by Coxis for Philip II. Hubert Van Eyck died in 1426. John is generally said to have died in 1441, but the date of his death is uncertain. (Raspe, Descamps, Lanzi, &c.)

EYE. The organs appropriated to the sense of sight are distributed very extensively, yet with that frugality which always regulates the operations of nature in the construction of animals. All the active species which live in the light are furnished with them; the rest are disqualified to possess as well as to profit by them, by their limited powers of locomotion, or by constant residence in the dark. In conformity with this rule, to which there are few, if any, exceptions, these organs are occasionally associated with the lowest types of animal development, and are sometimes absent in the highest. Thus some radiated animals, most of the articulated tribes, and many of the mollusca, have manifest organs of vision, and some of them are of the most curious and artificial construction: on the other hand, the mole and the shrew-mouse*, both vertebrated animals, and belonging to the highest order of that class, the mammalia, are blind. They have eyes, it is true; but those of the mole are not larger than the head of a pin, and are unprovided with optic nerves; and the equally imperfect eye of the shrew is covered with skin, from which hair grows as on the rest of the body. Hence, even in the absence of further evidence, we might conclude that if these animals have any perception of light, it can only be sufficient to warn them back to their haunts when by any accident they emerge to the day. But it is more probable that they do not see at all; and that these rudimentary organs, like the male nipple, exist only in conformity with the general model of vertebrated construction.

The structural peculiarities of the eye, as well as the presence of that organ, may be inferred with more certainty from the circumstances of an animal, than from the place it occupies in any zoological scale: in fact, no part has a closer relation to the habits and mode of existence. The eye may be simple or compound, single or multiplied, fixed or moveable: it may be encased in a hard transparent shell; or lie deeply imbedded within the protection of a bony socket; or project from the surface of the head at the extremity of a sensitive and retractile horn: it may be adapted for near or distant, oblique or direct vision; for seeing in a strong or a weak light, in a dense or in a rare medium; or it may be formed so as to accommodate itself to each of these conditions in its turn: and these peculiarities will all be found upon examination to be in strict accordance with the exigencies of the animal. Mere difference in bodily size, and the proportionate reduction or increase in the bulk of the eye, is sufficient to constitute a reason for a difference in its structure, and may suggest an explanation when such discrepancies are observed to exist in animals otherwise alike.

* *Aspalax cæcus.*

Yet with all the varieties in configuration to which we have alluded, it is rather in form than in substance that the eyes of animals differ from each other. The organ has always a common purpose, and is essentially the same in all cases: that is, we find an assemblage of the same fundamental parts, generally arranged in the same order, even when our powers of observation are assisted by the microscope, and until all traces of organization are lost in extreme tenuity of texture and the transparency which results from it. And although there are refinements in the structure of the organ of which we do not know the purpose, and certain delicate adjustments in the exercise of the faculty of which we do not know the instruments, yet upon the whole we can deduce the principles upon which the eye is constructed, and assign the uses of its several parts with great certainty from our knowledge of optical and physiological laws.

Having offered these prefatory remarks on the organ in general, we now proceed to the most interesting of its varieties—the human eye. We propose, in the first place, to describe its anatomical structure at some length, noticing as we proceed, or subsequently, some of the most remarkable peculiarities in the eyes of other animals. We shall then add a few observations on the physiology of vision, and complete our account of the organ with an outline of its most important diseases in the human subject.

The object, or what may be called the *general problem*, of the beautiful mechanism we have to consider, is to combine distinctness and extent of vision with the security and maintenance of the organ, and the utmost convenience in using it. The parts associated for these purposes are the *orbits*, or sockets, of the eye; the *optic nerve*; the *eyeball*, or globe, with its contents, and the external muscles which move and suspend it; the *eyelids*; the *lacrymal apparatus*; the nerves and vessels which supply these parts, and the mass of fatty and cellular substance which isolates and supports them. We shall describe these parts nearly in the order in which they have been enumerated.

Orbits.—The eyes with their appendages are lodged in two symmetrical roomy cavities in the skull, completed in front by the eyelids, but elsewhere entirely circumscribed by bone, the office of which, it need hardly be said, is to protect them from injury, and from any pressure that might embarrass the perfect freedom and precision of their movements. These cavities are called the orbits, orbital fossæ, or sockets of the eye. Seven bones of the cranium or face, which we need not enumerate, enter into the composition of each. They are separated from each other in their whole depth, which is about two inches, by the posterior chambers of the nose. They are conical in shape, or, more strictly speaking, pyramidal, and obscurely quadrangular. The apex is directed backwards; the base, about an inch and a quarter in width, is directed forwards, with a considerable inclination outwards or towards the temple. The margin is less prominent at the outer side than elsewhere, so that when viewed laterally it presents a wide semicircular notch, with the concavity forwards. One object of the divergence of the orbits, and of this retreating curvature of the outer margin, is obviously to increase the extent of vision. If the point of the finger be held before the eye, and carried gradually back towards the ear, it will be observed that, in consequence of this arrangement, it can be seen long after it has got behind a vertical plane touching the front of both eyes, which, taken together, are thus enabled to sweep over an angle of about 220°, or 20° on each side behind the tangent plane. Above and below, the edge is undercut as well as prominent, and the socket is therefore a little wider within than at the margin itself, so that it slightly overhangs the eyeball at these points. The inner or nasal sides pass directly backwards and are parallel to each other, and the roof is horizontal; consequently the conical form of the cavity arises from the inclination of the outer side and floor. In the angle between these sides, and in that between the first and the roof, there are two long irregular slits. The former opens into the deep hollow between the

temple and the back of the upper jaw; it is called the *foramen lacerum inferius*, or *spheno-maxillary fissure*, and gives passage to a branch from the fifth pair of nerves, which piercing the bone, passes beneath the floor of the orbit, and emerges upon the cheek through a hole just beneath the lower edge of the orbit, about a third part from the inner angle of the eye. The other slit, which is called the *sphenoidal fissure*, or *foramen lacerum superius*, opens into the cavity of the head, and transmits another branch of the fifth pair, which passing within the orbit, along the roof, comes out through an opposite notch in its upper margin, and is distributed upon the forehead and upper lid. These branches of the fifth pair, called the *supra* and *infra-orbitary* nerves, are the most frequent seats of that excruciating affliction the *tic-douloureux*. Through the sphenoidal fissure are likewise transmitted the ophthalmic veins, and all the other nerves except the optic destined to the eye and its appendages. A third opening, which is circular, called the *foramen opticum*, of the size of a large quill, and leading also from the cavity of the skull, gives passage through the sphenoid bone to the ophthalmic artery and the optic nerve. It is directed obliquely outwards and forwards, and is situated at the apex or back part of the orbit, in the angle between the nasal side and the roof. In the same angle, close to the margin, that is just within the corner of the eye near the nose, there is a deep groove leading into the lacrymal canal, to which we shall have occasion to recur hereafter.

Optic nerves.—The optic nerves, arising at the back part of the brain, with which they have extensive and important connections, not only where they seem to originate, in the *corpora quadrigemina*, but throughout the whole of the first part of their course within the cranium, pass horizontally forward above the floor of that cavity, converging towards each other till they meet, when they become closely united. It is probable that they not merely meet, but cross each other, the greater part, if not the whole, of the nerve from the *right* side of the brain going to the *left* eye, and *vice versâ*. It has been ingeniously supposed by Dr. Wollaston (*Phil. Trans.* 1824), in order to account for some singular phenomena of disordered and healthy vision, that this *decussation* or crossing takes place only with respect to those parts of each nerve which lie towards the other; so that each supplies the outer half of one eye and the inner half of the other. This he conceives would explain, among other things, the correspondence between the *homologous points* of the two eyes, which may be defined as those points which see the same object at the same time. It is scarcely possible to verify such speculations by dissection, from the softness and apparent homogeneity of the parts. In fish* the optic nerves cross each other entirely without touching; and in man, when the sight of one eye has been lost, the nerve beyond the point of union within the cranium has been observed to be wasted or diseased on the side opposite to that of the affected eye. [BRAIN; NERVE.] Beyond the point of junction the nerves again diverge from each other, and passing into the *optic foramen*, become invested in a tough, flexible, and fibrous sheath, which is a tubular production of the strong membrane called the *dura mater* which lines the cavity of the skull. The outer part of this sheath is reflected off as the nerve enters the orbit, and expanding, adheres to the bony surface of that cavity throughout, becoming its *periosteum*. The nerves, continuing to diverge, reach the eye-ball after a somewhat tortuous course of an inch in length. The curvature and laxity of the optic never give facility to the movements of the globe, and preserve the delicate structures within it as well as the nerve itself from the injurious effects of tension. Its length is such as to allow the eye-ball to project slightly beyond the edge of the socket in front and to afford space behind for the action of the muscles which move it, and a suitable distance between their points of attachment. Including the thickness of the sheath, it is about one-sixth of an inch in diameter. It does not consist, like other nerves, of a bundle of distinct fibres, but of a medullary pulp inclosed in minute transparent tubes. The sheath is pierced half an inch from the globe by a vessel called the *arteria centralis retinæ*, which, accompanied by several small veins, reaches the axis of the nerve, and passes with it into the interior of the eye. The nerve does not enter the back of the globe exactly in the axis of vision, but about the fifth part of an inch from it, in a horizontal line, on the inner or nasal side, and subtending an angle of about 23° at the centre of the eye. At this point the dimensions of the sheath are suddenly contracted, and it terminates in a thin cul-de-sac, pierced with minute holes or pores, hence called the *lamina cribrosa* (sieve-like plate). Through these pores the pulp of the nerve, divested of its tubular involucra, passes into the interior of the globe in divided portions; but immediately reuniting, expands at the back of the eye into a delicate cup-shaped membrane, with the concavity directed forwards. This expansion of the optic nerve is called the *retina*; it is the most important part of the eye, having a peculiar and exclusive sensibility to the impressions of light, of which immediate notice is conveyed from it along the collected nerve to the brain. All other parts of the mechanism of vision are subordinate to this; and their whole office, independently of the conservation of the organ as a part of a living body, is to regulate the quantity of light admitted into the eye, and to distribute it in such a way upon the surface of the retina, that the impression, which, if immediately received, would be confused and general, may be an exact counterpart of the visible surface of the object.

Mechanism of distinct Vision.—A specific account of the several provisions which conduce to this end will be more readily apprehended if the circumstances which make each of them necessary be first briefly passed under review, and the requisite parts be supposed to be added to the retina in succession.

The most elementary fact that we know respecting light is, that it proceeds in straight lines or rays from every point of a luminous or illuminated body. A sensitive surface or retina presented nakedly to such a body would therefore intercept innumerable cones or pencils of light, each diverging from a different point of the object. But each point of the retina must also be considered in that case as the apex of a cone of rays *converging* upon it from *every* part of the object; and it is manifest that the various impressions thus received upon the same point at the same time would be undistinguishable from each other. All therefore that we can conceive to be communicated to the mind by the sum of such indefinite impressions over the whole retina, is a knowledge of the prevailing colour of the object, and possibly a general idea of its direction. But if there were more objects than one, or that one had 'parts or magnitude,' even this inconsiderable addition to the mere sense of light and colour would be impossible. The confusion resulting from the simultaneous impressions of a multitude of pencils of light on the same surface would be partly removed if the seat of perception were placed at the bottom of a cavity capable of being turned to each object or each part of the same object in succession, inasmuch as this would prevent the interference of rays proceeding from parts not actually under contemplation; but an indistinctness would still remain in proportion to the magnitude of the field of view, only remediable by narrowing the cavity to a mere capillary tube, upon the inconvenience of which we need not enlarge.

Let us consider what would be the effect of a very simple addition to the cavity. We will suppose it to be closed in front by a dark screen, perforated with a small central hole as in the section represented in *fig.* 1.

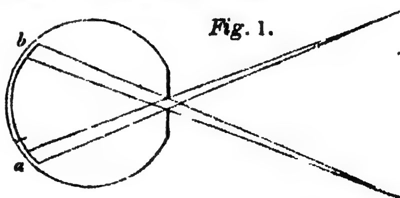
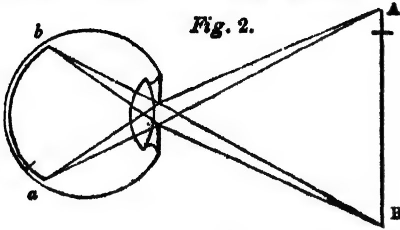


Fig. 1.

In this case pencils of rays crossing each other from A and B, the top and bottom of an object, would impinge at *a* and *b* upon different parts of the retina. By this means the advantages of a large and a small field of view would be combined, a *distributed* impression of the object would be produced, and its several parts would be seen separately and in their proper relative situations. The effect may be easily shown by holding a card, pierced with a smooth circular hole, near a taper, and throwing the spectrum upon a wall at a little distance. Such a screen is termed the *iris*.

* Except in the haddock (*gadus morrhua*), D. W. Soemmering, 'Sect. Horizont. Ocul.' In this fish they do not cross each other, but pass to the orbit on the same side.

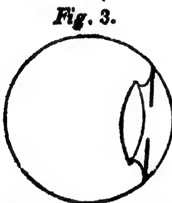
But still the rays from each point of the object would be diffused over a *space*, instead of being collected upon a separate *point* of the surface, and the impressions of contiguous pencils would in some degree overlap and confuse each other. This inconvenience might be lessened by contracting the opening, but another cause of indistinctness would then be introduced in the diminished admission of light.



Both evils might be avoided if a *lens* of a proper construction were fixed behind the screen (as in *fig.* 2). Pencils diverging from single points of the object would thus be admitted through the opening, which we will call the *pupil*, and would be made to *converge* to single points on the surface, and the impression would now be an exact counterpart of the object, A being distinctly seen in its true place and direction from *a*, and B from *b*.

But additional provisions would be necessary to bring this arrangement to the requisite degree of perfection. In the first place the retina must be adjusted to correspond in shape with the focal distance of the lens. This purpose might be accomplished, if the walls of the cavity were composed of flexible materials, by interposing a transparent fluid between the lens and the retina, which, by its uniform distension, would constrain the latter to take and retain the form of a portion of a sphere.

Again, although the diagram has been otherwise drawn for an obvious reason, our arrangement hitherto supposes the object to be very small, and to be seen directly in front of the eye; but if oblique as well as direct pencils are to be brought to a focus, that the lateral vision may be also *distinct*, a second refracting body, of a proper form, must be placed in front of the lens. This may be done very conveniently, with the further advantage of completing the cavity, by adding a transparent portion to its walls in front of the screen, to be likewise distended with fluid in order to keep it in the shape of a segment of a sphere (*fig.* 3.)



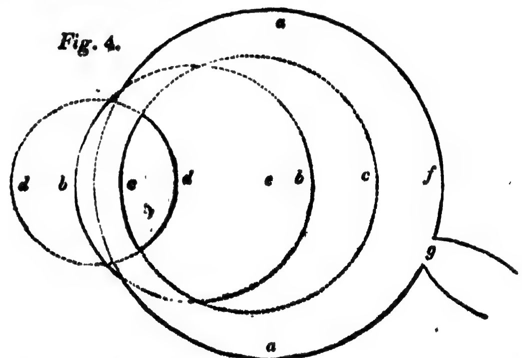
It is also desirable that the back of the screen and the interior of the cavity should be blackened, that the rays may be extinguished after impact upon the retina, lest any internal reflection should interfere with the impressions on other parts. The expediency of this provision is always kept in view in the construction of optical instruments, and may be made evident by looking at a bright object through a polished metal tube. The colouring matter is called the *pigmentum nigrum*, or, simply, the *pigment*.

The only remaining artifice to secure the perfection of the organ that need be mentioned in this synopsis of its most essential provisions, is to endow the pupil with the faculty of contraction and enlargement according to the quantity of light. If it were of a constant size, more light would be concentrated upon the retina from a bright or a near object than from one comparatively distant or faintly illuminated; and as the sensibility of the retina must remain the same, the disproportion would occasion dimness of sight in one case and dazzling in the other, and might even impair the nerve.

We have thus imagined all the parts to be built up in succession that are of primary importance (as far as we know) in the construction of an organ of *distinct vision*, and the figure to which we have arrived might pass as a tolerably correct diagram of the human eye.

The laws of light and sensation require that there should be a general type in the structure of these parts, and a mutual relation among them as to density, form, and position. But this does not preclude much variety; a difference of position, for instance, may be, and frequently is, compensated by a corresponding difference in form or density either of the same or other parts. Hence the problem of distinct vision has many solutions, each perfect in its kind. In fact nothing can be more diversified in unimportant particulars, or more uniform in those which are essential, than the interior constitution of the eye in different animals: it is never precisely the same in any two species, however closely they may be allied; but we constantly find the retina, the lens, and the pigment, and generally the iris, enclosed of course in some kind of capsule, transparent in front, and partly occupied by complementary fluids. To this there are some exceptions, which however we believe to be only apparent. Thus the larvæ of many insects, the *cercariæ*, and other microscopic animalcules, and some of the molluscs, have red or black spots upon their surface, which are undoubtedly eyes, and are thought by some to be little more than expansions of an optic nerve beneath a thin coloured membrane to absorb the light, and in some unknown way to distribute its impressions. But when observation fails us, our presumptions with respect to natural phenomena should be guided by analogy and accord with known principles; and as nothing that we know of light enables us to conceive how so inartificial a construction as this can account for the acute vision obviously enjoyed by some of these animals, we are disposed to adopt another view of such coloured points, and to consider them as a congeries of extremely minute but perfectly formed eyes of the usual construction, of which the pigment alone is visible from its opacity and abundance. The myriads of simple eyes observed under the microscope to be grouped together in the compound organs of the perfect insect and other articulated animals, as the scorpion and crab, afford strong analogical grounds for this opinion.

We now resume our account of the anatomical structure of the human eye.

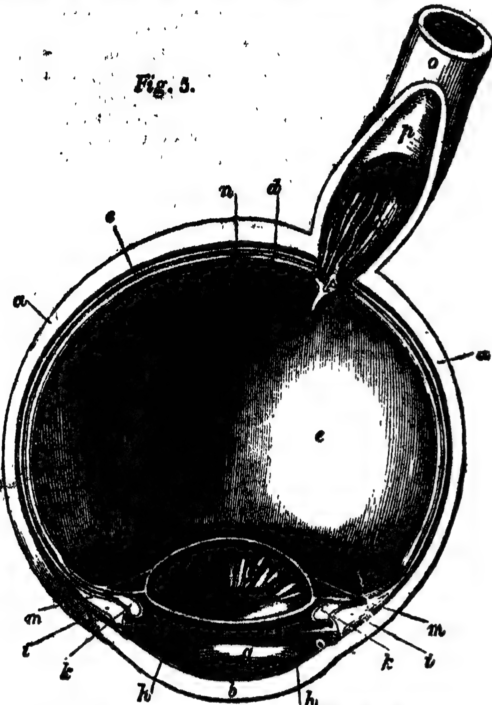


Section of the spherical surfaces of the eye, twice the natural size; the circles completed in dotted lines.
a, Sclerotic. *b*, Cornea. *c*, Anterior surface of lens. *d*, Posterior surface of lens. *e*, Centre of the eye. *f*, Intersection of the axis of direct vision with the back of the eye. *g*, Entrance of the optic nerve.

Globe.—The globe, or eyeball, contains the parts immediately concerned in vision. It consists of very unequal portions of two spheres of a different size, which have a common circular intersection in a transverse vertical plane, much nearer the front than the back of the eye. The iris, or coloured screen, perforated centrally by the pupil, nearly occupies the situation of this imaginary plane, but is, strictly speaking, behind it. The posterior and larger portion is circumscribed by the sclerotic membrane, except in front, where it may be considered as bounded by the iris: it is rather less than an inch in diameter, and constitutes about five-sixths of the surface of the globe. (*Fig.* 4, *a*.) The included space is occupied by the choroid membrane and retina, the vitreous and crystalline humours, the ciliary body and processes, and a small part of the aqueous humour. The anterior portion, which forms about a quarter of a sphere, thirteen-twentieths of an inch in diameter (*Fig.* 4, *b*), and occupies the remaining sixth part of the surface of the globe, contains the rest of the aqueous humour, and is bounded in front by the transparent and slightly prominent disc set in the sclerotic like a watch-glass in its metallic rim, and known as the *cornea* from its horny texture. Its transverse chord, or the diameter of the circle of union be-

tween the cornea and sclerotic is nine-twentieths, or nearly half an inch in length.

The globe derives its firmness to the touch from the distension of the contained fluids: its capability to bear that distension, which insures the permanence of its shape, is due to the flexible but strong and inelastic outer covering or tunic, consisting as we have said of the sclerotic and cornea.



Section of the globe of the right eye through the optic nerve.

a, sclerotic; *b*, cornea; *c*, choroid; *d*, retina; *e*, vitreous humour; *f*, crystalline humour or *lens*; *g*, aqueous humour; *h*, iris; *i*, ciliary ligament; *k*, ciliary processes; *l*, ora serrata of the ciliary body; *m*, canal of Petit; *n*, foramen of Soemmering; *o*, sheath of the optic nerve; *p*, substance of the nerve; *q*, arteria centralis retinæ.

Sclerotic. (*Fig.* 5, *a.*) The sclerotic membrane is so called from its toughness (σκληρός, hard, rigid). It may be considered as an expanded prolongation of the sheath of the optic nerve, which it resembles in its interwoven fibrous texture. Its inner surface is continuous with the lamina cribrosa already mentioned. Immediately around this part it is about an eighth of an inch thick, and gradually becomes thinner as it approaches the cornea, which it slightly overlaps. The two structures are not separated by an abrupt line, but are blended together, and adhere so closely that they cannot be torn asunder without great force. The thin glistening tendons of the muscles which move the globe, or rather their smooth outer laminæ, are spread over and incorporated with the sclerotic in front, approaching each other till they unite near its junction with the cornea. They render it somewhat thicker in this situation than in the spaces between them or behind the line where they begin to be inserted. This front part of the capsule of the eye is called the *tunica albuginea*, from the whiteness characteristic of all tendinous parts.

Conjunctiva. The albuginea is defended from contact with the air by a transparent mucous membrane, continuous with that which lines the interior of the eye-lids. It is called the *conjunctiva reflexa* or *adnata*, to distinguish it from the *conjunctiva propria* of the lids. It is very loosely connected to the sclerotic at first to facilitate the movement of the globe; as it advances forward it becomes more closely attached to the albuginea; and hence extending to the cornea, adheres intimately to its margin and over its whole surface. The conjunctiva is the most sensitive external part of the body to all painful impressions, except cold, especially where it invests the cornea. The smallest particle of foreign matter in contact with it gives intolerable pain, and makes the act of winking to clear it away imperative on the will; and hence its chief and most essential use as part of the delicate organ of which it may be considered as the guardian. If the nerve which supplies it with sensibility be divided or injured, incidental causes of irritation are suffered to produce their injurious effects unheeded, and the eye soon becomes inflamed, ulcerates, and is destroyed.

Cornea. (*Fig.* 5, *b.*) The cornea is somewhat thicker than the sclerotic except at the back of the eye, is equally tough though rather more flexible, and of a much closer and more even texture. Its inner surface is concave, and nearly parallel to its outer surface; it is however rather thicker in the middle than elsewhere, and the general statement that it has no share in effecting the convergence of incident rays on account of the parallelism of its surfaces is therefore not quite correct. It is covered externally, as we have already mentioned, by the conjunctiva, and is lined internally by a delicate elastic membrane. The bulk of the tunic, or cornea proper, consists of several layers which slide upon each other when the membrane is rubbed between the finger and thumb, and are separated in the natural state by a limpid fluid contained in a delicate cellular structure. This fluid gives plumpness to the outer surface, which is represented by some authorities to be not *exactly* spherical, but of that kind which would be formed by the revolution of an ellipse of small excentricity about its long axis.



The sclerotic partly removed, and the rest turned back, showing the Choroid Coat and Iris.

Chorioid or Choroid membrane. (*Fig* 5, *c*, *Fig.* 6.) We have now to consider the internal tunics of the eye, the first of which is the choroid, or, more properly, *chorioid* membrane, so called from some resemblance in the flocculence of its outer surface to the *chorion*, or external investment of the ovum. This is a thin soft dark-brown structure in contact with or lining nearly the whole concave surface of the sclerotic. It may be said to originate around the entrance of the optic nerve, which passes through it before it expands into the retina; and it terminates in the posterior margin of the ciliary ligament or circle (*fig.* 5, *i*),—a flattened band of grey matter, about the seventh part of an inch in breadth, attached to the sclerotic internally near its junction with the cornea. In these situations the two membranes adhere with some firmness; they are elsewhere connected by vessels which pierce the outer and ramify upon the inner membrane, and by the filaments of a fine intermediate cellular tissue. But the connexion is so slight that it may be readily broken by gentle inflation with a blow-pipe insinuated through a puncture in the sclerotic, without injury to the fragile texture of the choroid. The choroid consists almost entirely of a multitude of minute vessels, curiously interlaced, and communicating freely with each other. It is supplied with blood by 15 or 20 branches of the ophthalmic artery, which pierce the sclerotic round the entrance of the nerve, and are at first distributed externally on the posterior part of the sphere; but they finally pass inwards, and terminate in a close and uniform vascular expansion over the whole concave surface. This is called the tunic of Ruysch, who erroneously considered it as a distinct membrane. The innumerable veins of the choroid, or *venæ vorticosæ*, are arranged with great elegance and regularity in arched and drooping branches, like the boughs of the weeping willow; they are very conspicuous upon the outer surface, above the first exterior ramifications of the arteries. (*Fig.* 6.) They unite in four or five common trunks, which emerge through the sclerotic at equal intervals behind the middle of the eye-ball. The outer surface of the choroid is somewhat rough and flocculent; the inner surface, upon which the retina is expanded, is delicately smooth and even. Both are abundantly coated with the pigment, which is secreted by every part of the choroid, and pervades its loose and porous texture.

Pigment.—In man this matter is of a deep brown; in most other animals it is black, and hence is very commonly called the *pigmentum nigrum*. It appears

no part of the texture it pervades, and when the outer membranes are removed by maceration in water, it may be washed away. Both have a relation in quantity as well as in depth of tint to the complexion and colour of the hair. In the negro the iris is of so dark a hue that it can scarcely be distinguished from the pupil; while in the white rabbit and other albinoes, including the human variety, where the pigment is entirely wanting from some original malformation, the substance of the iris is transparent, and reflects only the pink colour of the circulating blood. Such eyes are dazzled by a strong light, and probably see better than others in the dusk. The iris, if minutely injected, appears, like the choroid, to be composed almost entirely of vessels. It is principally supplied by the two long ciliary arteries (*Fig.* 6)* which pierce the sclerotic about half an inch from the optic nerve on either side; and passing between that membrane and the choroid, divide near the edge and in the substance of the ciliary ligament, and are wholly distributed to the iris. Their branches are disposed in two conspicuous circles on the front surface, one near the outer or ciliary margin, the other not far from the pupil. But though the iris resembles the choroid in vascularity, it differs essentially from it in other respects. It is richly supplied with nerves, which proceed to the iris and are distributed upon it much in the same way as the arteries, and are the medium of its sympathy with the retina, and the source of its irritability. It also possesses a peculiar contractile power, thought by some to reside in fibres which they represent to be muscular, and to be disposed circularly in front and at the fore edge, and in a radiated form behind. (*Fig.* 9, *b.*) The former of these layers is supposed to contract and the latter to dilate the pupil. But this fibrous appearance may be deceptive, and is attributed by others to circular arrangements of the vessels and nerves, and to streaks and minute folds in the membrane itself.

Pupil. (*Fig.* 9, *a.*) The pupil in the human eye is bounded by a sharp well-defined circular edge. In other animals its shape is subject to many varieties which may often be explained by a reference to their habits and circumstances. In fish it is generally crescentic or imperfectly quadrangular. In herbivorous animals, which often continue to browse during the night, it is oblong and obliquely transverse, as in the horse and sheep. In most serpents and many rapacious quadrupeds, both aquatic and terrestrial, the pupil, though round and large at night, is a mere vertical slit when seen by day, especially in the smaller species of each genus, as in the common cat. It is curious that in the larger cats, as the lion and tiger, as well as in some of the larger four-footed reptiles, the pupil again becomes circular. In all birds, we believe, the pupil is round; and it may be observed that, with few exceptions, they all sleep after night-fall. In the few nocturnal species, as the owls, the pupil is very large though still round, and these birds always shun the day. The long narrow pupil i in fact a provision for a greater variation in size than the circular form permits, and is generally found in those animals which roam at night and also see well by day. When absent in such animals the bulk of the organ is commonly sufficient to secure the admission of a sufficient quantity of light after sunset without this provision. In the fœtus the pupil is closed by a vascular film called the *membrana pupillaris*, one function of which is precisely that of the centering of a bridge, to support and extend it during the process of its construction. A tubular film of the same kind has been lately discovered by Müller stretched between the margin of the pupil and the ciliary body. Both these films are absorbed before birth.

Ciliary body and processes. (*Fig.* 5, *l*; 9, *d c*). Upon the compressed anterior surface of the vitreous humour where it curves inwards from the sclerotic towards the lens rests the ciliary body, a thin, dark, annular band, about the fifth part of an inch in breadth, consisting of a frill of flat converging plaits, which encircle but do not reach the circumference of the lens. The posterior aspect is concave, and adheres loosely over the rounded vitreous humour; the front is convex, and is firmly attached to the whole breadth of the ciliary ligament, and to a small portion of the back of the iris near its junction with the ligament. It appears to be a continuation of the inner layer of the choroid, or tunic of Ruysch, but is rather thicker, and resembles it in extreme vascularity. The medullary matter of the retina terminates, as we have seen, at the indented posterior margin (*ora serrata*) of this membranous band. The ciliary body is everywhere thickly coated and pervaded with pigment, except at the extremities of about seventy minute unattached points which fringe the inner margin, and radiate towards the lens like the florets of a marigold round its central disc. These are the *ciliary processes.* (*Fig.* 5, *k*; 9, *c.*) They are separated from the uvea by the fluid of the posterior chamber, and are received behind into corresponding depressions in the vitreous humour.

Zone of Zinn.—If the ciliary body be carefully peeled off, and the thick radiated masses of pigment it leaves behind be washed away, a thin, transparent, and puckered membranous surface is exposed, extending from the indented margin of the retina nearly to the capsule of the lens, which appears to be something more than the mere external surface of the hyaloid membrane. This is called the *zone of Zinn*, from the anatomist who first drew attention to it. Various opinions are entertained of the nature of this zone. By some it is supposed to be a continuation of the vascular web, which may be called the internal tunic of the retina, arching round from the ora serrata, just as the tunic of Ruysch is continued into the ciliary body which lies upon the zone and corresponds with it in extent. The question is more curious than important in the present state of our knowledge of the functions of both of these delicate and elaborately constructed parts of the eye. The same remark may be extended to the controversies that subsist with respect to the part we have next to describe.

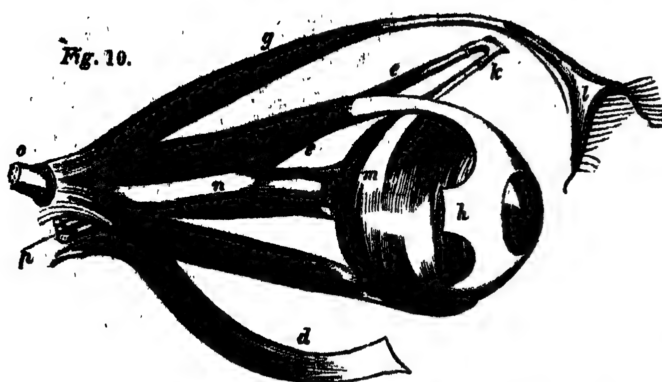
Canal of Petit (*Fig.* 7, *b*; 5, *m*). If the transparent membrane between the zone of Zinn and the margin of the lens be slightly punctured, and the point of a small blow-pipe be gently introduced, a canal may be inflated extending all round the lens in close proximity with the capsule, resembling a string of small glass beads laid in a circle. This is the *canal of Petit*. Whether the hyaloid membrane here separates into two layers, or whether the membrane of the aqueous humour lies upon it in this situation for a certain space without adhering, or how otherwise this canal is formed, it is not easy to say. In the natural state of parts it is empty and flaccid. When it is inflated the fine white triangular tips of the ciliary processes are seen to be received between its minute protuberances. But the points are loose and floating, and are not attached, as was formerly supposed, to the capsule of the lens.

Dr. Brewster has stated an opinion that the ciliary body is a muscular organ calculated to effect certain changes of curvature in the surfaces of the lens, or in its position, which seem to be required by the laws of refraction to account for the adjustment of the eye to different distances. Dr. Thomas Young was no less confident that the true solution of this optical enigma was to be found in the imagined muscularity of the fibrous structure of the lens itself. Both are high authorities, but neither opinion appears to have gained any ground.

Appendages of the Globe.—The eye-ball, of which we have thus described the contents, is lodged in the cavity of the orbit, a little nearer the inner than the outer side. In front, where the protection of bone is wanting, the two moveable and muscular eye-lids supply a sufficient defence, and contribute, by their gentle and constant pressure, to keep the eye in that state of equilibrium between opposite forces upon which the steadiness and precision of its rapid motions in a great measure depend. The space in the socket not occupied by the globe and its appendages is completely filled by a cushion of soft fat contained in elastic membranous cells, which permits the free movement of the several parts, while it keeps them separate, and affords them all, as well as the globe itself, a suitable and uniform support. Varieties in the quantity of this substance, in the capacity of the orbit, and in the development of the lids, determine the different degrees of prominence and of apparent size observed in the eyes of different persons; for the globe itself is nearly of the same size in all.

Muscles of the Eye-ball.—The movements of the globe are effected by six muscles arising from the bony surface of the orbit, and inserted into different parts of the sclerotic. Four are called *recti*, that is straight or direct muscles; the fifth and sixth are the *obliqui superior* and *inferior*, so called from the obliquity of their insertion, and their respective positions above and below the globe. The fifth, or superior oblique, is also called the *trochlearis*, from the *trochlea* or pulley through which the tendon passes.

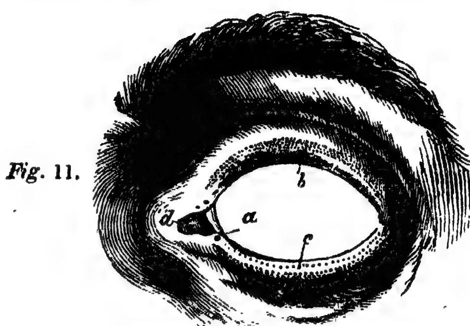
* One of the long ciliary arteries is represented in the figure by the middle white line; the narrower lines are the ciliary or iridian nerves.



a, Rectus superior; *b*, Rectus inferior; *c*, Rectus internus; *d*, Rectus externus, arising by a double head. It is represented as cut off from *h*, its insertion into the eye-ball, and turned aside to show the parts behind it; *e*, Obliquus superior, a round and tapering muscle terminating in a round tendon, which passes through a pulley or loop (*k*), and is reflected under the flat tendon of the rectus superior, and, becoming flat, is inserted at (*m*) into the sclerotic; *f*, Obliquus inferior coming round over the tendon of the rectus inferior from the front and inner edge of the orbit, near the inner corner of the eye, and inserted into the sclerotic opposite the insertion of the superior oblique; *g*, Levator palpebræ superioris, ending in a flat tendon, which is inserted into (*l*) the crescentic tarsal cartilage of the upper lid; *o*, *n*, the optic nerve; *p*, the nerves of the 3rd, 5th, and 6th pair, which pass between the two heads of the rectus externus. The rest of their course is not shown.

Lateral view of the right eye-ball, seen from the outer side, with its muscles. (This cut is to be considered only as a diagram, the proportions of the parts having been much altered to make them more distinct.)

The recti (*Fig.* 10, *a*, *b*, *c*, *d*) are four flat ribbon-like muscles, each about half an inch broad, which arise together round the edge of the foramen opticum, and embrace the nerve at its exit from the skull. They end in broad, thin, glistening tendons, attached to the sclerotic at four equidistant points, about a quarter of an inch from the edge of the cornea, above, below, and on either side. Hence they are designated as the superior, inferior, internal, and external straight muscles. We have already explained how the outer surfaces of their tendons are blended, and form the tunica albuginea. Each turns the pupil towards the side of its insertion; and it is easy to see how by their single actions, or by a proper combination of two that are contiguous, the pupil may be turned in any required direction. The rectus externus, from its position on the diverging side of the orbit, is necessarily the longest of these muscles. It has also a double origin, arising not only in common with the rest from the edge of the optic foramen, but also from the edge of the sphenoid fissure, and arches over several nerves which enter the orbit by that passage (*p*). The superior oblique or trochlearis (*e*) is a round tapering muscle, which arises near and on the nasal side of the rectus internus (*c*), and ends in a smooth round tendon. The pulley (*k*) through which this tendon passes is a small loop of cartilage fixed to the roof of the orbit towards the nasal side, just within the margin. In this situation the tendon is enveloped in a lubricated extensible sheath called *bursa mucosa;* thence spreading into a thin fan-like expansion, it is reflected obliquely backwards and outwards between the globe and the tendon of the rectus superior (*a*), and is inserted into the back part of the sclerotic at a point (*m*), intermediate between the optic nerve and the insertion (*h*) of the rectus externus, and nearer the former. Its separate action turns the pupil downwards and outwards. The inferior oblique (*f*) arises broad within the lower edge of the orbit towards the nasal or inner side, and passing obliquely backwards over the tendon of the rectus inferior (*b*), is attached to the sclerotic at the outer and back part opposite the insertion of the trochlearis. It directs the pupil upwards and outwards, supposing the eye to look originally straight forwards: if the pupil be inclined either way, to the nose or to the temple, the inferior oblique increases that inclination, being equipoised as to lateral action when the eye is slightly turned inwards, as in reading. But its tendency is always to turn the pupil upwards. To a certain extent the same remark is applicable (*mutatis mutandis*) to the action of the antagonist muscle, the superior oblique, which if exerted at the same time would counteract the tendency upwards, so that both taken together would keep the eye in that easy position so often assumed by man and animals in looking without much effort yet steadily at near objects, as in taking food, reading, and most other quiet occupations. The position we mean is that in which the axes of vision are directed slightly towards each other and a little downwards, and the eye-balls are gently pressed against the lids and by them, and thus are kept in a convenient and steady equilibrium. When the oblique muscles act together with force, they hold the eye-ball firmly against the lids and to the nasal side of the orbit. One or both of these muscles, as well as the rectus externus, are supposed to be endowed with certain automatic or involuntary actions, very useful in the economy of vision. Their functions in this and other respects have given occasion to much curious disquisition.



View of the left eyebrow and lids, showing their tarsal margins.

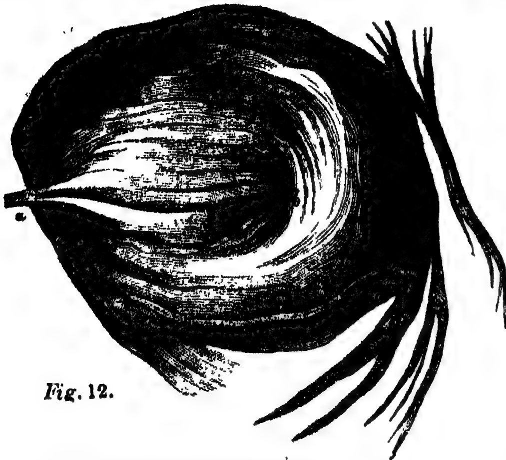
a, Lower *punctum lachrymale*; *b*, tarsal edge of the upper lid; *c*, orifices of the ducts of the Meibomian glands (those on the upper lid are similar); *d*, *caruncle*, situated at the inner *canthus*, or corner of the eye.

The double line of points external to the Meibomian orifices marks the situation of the eye-lashes, which are removed.

The Eyelids or Palpebræ. (*Figs.* 11, 12, 13.) The textures which enter into the composition of the eyelids are included between a soft external skin and a moist smooth internal surface, called the *conjunctiva palpebralis* or *propria.* (*Fig.* 13, *a a.*) The latter is a membrane of the mucous kind, which, as we have already mentioned, after lining the interior of the lids, passes across in a loose circular scroll or fold to the sclerotic, and is reflected back again over the front of the eye, where it is called the *adnata* or *conjunctiva reflexa.* The name is derived from the junction thus effected between the ocular and palpebral surfaces. The outer skin of the eyelids, which is extremely soft and delicate, yet capable to a considerable extent of adapting itself to different degrees of extension, is loosely connected to the subjacent parts, except at the margin (where it adheres more closely), by a moist and abundant cellular tissue, entirely devoid of fat. By means of this connection, when the upper lid is raised and these under-lying parts are retracted under the edge of the orbit, the superfluous skin is gently drawn after them, and is disposed of conveniently under the brow (*supercilium*). The eye-lids meet, when closed, by two narrow flat surfaces, accurately applied to each other, called their *ciliary* or *tarsal* margins. These epithets are respectively derived from the *tarsi* or thin concave and crescentic shells of smooth and elastic cartilage which give form to the lids, and firmness and outline to their opposed edges (*Fig.* 10, *l*); and from the lashes or *cilia*, which grow in several rows at the margins of both lids, from their extreme outward verge, and in the direction of the flat surfaces. The angles in which the margins of the eye-lids meet towards the nose and temple are called the *canthi.* The outer canthus is kept in its place during the motions of the part by a tendinous expansion or *aponeurosis*, which, adhering to the thin crescentic edges of both tarsi on their outer or convex surface, attaches them, and most closely on this (the temporal) side, to the margin of the orbit. It is called the broad ligament of the tarsi. The nasal extremities of the tarsi are confined to the side of the nose by two slips which are given off behind from the tendon of the orbicular muscle.

Muscles of the Eyelids.—Immediately beneath the subcutaneous cellular tissue there is a broad layer of muscular fibres arranged elliptically round the transverse

fissure of the eyelids, the disposition of which is well shown in the annexed figure. (*Fig.* 12.) The office of



View of the orbicular muscle of the left eyelid, as it appears when denuded of the integuments.

a, The tendon at the inner angle, or *canthus* of the eye; *b*, the outer canthus drawn in by the ligamentous attachment of the tarsal cartilage to the temporal side of the orbit.



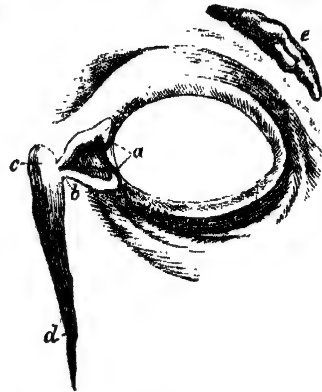
View of the internal surface of the right eyelid and lachrymal gland.

a, Conjunctiva propria, or mucous lining of the lid. The edges of the fold which passes to the sclerotic are seen loose and floating; *b*, lachrymal gland; *c*, orifices of the lachrymal ducts; *d*, tendon of the elevator muscle of the upper lid; *ee*, parallel rows or clusters of the Meibomian glands; *f*, the semilunar fold of the conjunctiva at the inner canthus, which is the rudiment of the third eyelid of birds and other animals. Near *f*, on the right, are seen the two puncta lachrymalia.

this muscle, which is called the *orbicularis*, is to close the lids; and it is capable of acting under certain circumstances with great force. It is collected at the inner angle or canthus of the eye into a round short tendon, which is attached in that situation to the bone. Elsewhere it is connected with the skin, and aponeurotic expansions of the face and forehead. It is also connected with the *occipito-frontalis muscle*, which elevates the eye-brows, and with the *corrugator supercilii*, which wrinkles and knits them in the act of frowning. A person acquainted with mechanics will have no difficulty in perceiving the advantage derived from the oblique, or, as it might almost be called, the *incidental* action of the orbicularis in closing the lids, to the edges of which its fibres are parallel. A more direct application of muscular force would have been more powerful; but the actual arrangement secures a rapidity incomparably more conducive to the function of the eyelids, which is to cleanse and moisten the surface of the eye.

Levator Palpebræ superioris. Below the orbicularis, in the upper lid, is the broad tendon of the muscle which elevates the upper lid. (*Figs.* 13, *d*; 10, *g*.) This muscle arises from the edge of the optic foramen, just above the rectus superior, and passing over it along the roof of the orbit, forms the thin tendon we have mentioned, which is inserted into the inner surface, or rather the thin upper edge of the tarsal cartilage. There is no such provision for depressing the lower lid, which is rendered unnecessary by its inferior extent. Moreover the muscle we have just described sufficiently answers the purpose, by pressing down the globe and causing it to slide a little forwards; as may be easily felt if a finger be placed against the lower lid when the eye is closed, and suffered to remain while the upper lid is slowly raised.

Meibomian Glands. (*Fig.* 13, *e e*.) Between the tarsus of either lid and the conjunctiva are disposed numerous vertical rows of minute whitish grains, which appear through the semi-transparent mucous membrane, and occupy an elliptic space, taking both lids together, of about half an inch in width, exactly in front of the globe. These are called the Meibomian glands, from their discoverer. They secrete an unctuous matter which passes into tubes centrally placed in each row, and exudes from as many minute orifices on the ciliary margin of the lid. (*Fig.* 11, *c*.) There are about forty of these parallel clusters in the upper lid: in the lower there are not so many, nor are they individually so long. We need not dilate upon the use of this secretion, which often collects in a sensible quantity upon the edges of the lids during sleep, especially when the glandular action is excited by slight inflammatory irritation of the part. The palpebral conjunctiva, already described, immediately covers these glandular corpuscles. The *caruncle*, a small red prominence at the inner angle of the eve (*Fig.* 11, *d*) consists of a number of similar bodies.



a, The two puncta leading into the lachrymal ducts; *b*, the common entrance of these ducts into the lachrymal sac; *c*, the head of the lachrymal sac; *d*, the narrow portion of the sac, or membranous lachrymal canal passing downwards to the nose; *e*, the lachrymal gland.

Lachrymal Apparatus. (*Figs.* 13, 14.) At the upper and outer part of the interior of the eyelid are several minute orifices (*Fig.* 13, *c*), generally seven in number, arranged in a half-circle, which lead into the secretory ducts of the lachrymal gland. (*Fig.* 13, *b*; 14, *e*.) This is a white flattened lobulated body, of the size of a large bean, lodged in a depression just within the margin of the orbit, and covered externally by the orbicular muscle. The function of this gland is to secrete the tears; and is probably always going on, although not in a degree sufficient to be remarked, except in weeping, or when some foreign body or acrid vapour stimulates the surface of the eye, and by sympathy excites the gland to unusual secretion.

The involuntary actions of the rectus externus and inferior oblique muscles, to which we have alluded, are supposed to have a relation to the lachrymal secretion. In the act of winking, the eye-ball is thrown up in an outward direction, as it would be by the action of these muscles, which not only brings the cornea into the vicinity of the ducts, but makes pressure upon the gland, while it relatively increases the rapidity with which the lids, drawn in winking towards the fixed nasal tendon are swept over the surface of the globe. That there is such a movement, however produced is certain: the motion of the prominent cornea may be felt by the finger gently pressed upon the half-shut lid if it be completely and suddenly closed. The approximation of the lids towards the nose in winking is one of several provisions by which offending particles or superfluous fluids are brought to the inner canthus of the eye to be protruded or absorbed. In this situation there is a vacant space partly occupied by the caruncle, called the *lacus lachrymalis* (*Fig.* 11, *d*); it is a sort of reservoir or rather *sink* for the tears. Above and below, at the entrance to this space where the ciliary margins terminate, there is a small prominence on the inner edge of both, (*Fig.* 11, *a*; 14, *a*,) centrally punctured by small orifices. These are the *puncta lachrymalia*. Their inward aspect is well shown in *Fig.* 13. They are the emunctories of the

eye; and their function is to absorb the fluids presented to them, and convey them by two converging canals (*Fig.* 14, *a*) to the *lachrymal sac* (*Fig.* 14, *c*), which they enter by a common orifice, (*Fig.* 14, *b*). This is a membranous bag about as large as a kidney-bean lodged in a groove in the lachrymal bone, behind the tendon of the orbicular muscle. The lachrymal sac entering a vertical channel in the bone at the end of the groove is narrowed into the *lachrymal canal* (*fig.* 14, *d*), and passes directly downwards into the inferior meatus or chamber of the nose which it enters on the outer side by a slit in the mucous lining. It is not exactly understood in what way the puncta absorb,—whether by capillary attraction or by some vital force of suction. The side of the lachrymal sac is connected with the tendon of the orbicularis, which may aid in producing the effect by suddenly drawing its membranous surfaces apart. We all know the effect of repeated winking when the eyes are filled with tears.

Nervous and vascular constitution of the Eye.—Enough has been already said, for general information, with respect to the blood-vessels distributed to the eyeball, and it is not necessary to mention those which supply the appendages. With respect therefore to vascular arrangements we have only to add, that although there are abundant proofs of the existence of an active absorption within the globe, no lymphatic vessels especially destined to that function have been hitherto found in it. The optic or second cerebral nerve has been already described. All the straight muscles, with the exception of the rectus externus, the inferior oblique, and the levator palpebræ, are supplied by the third nerve. The fourth is wholly distributed to the trochlearis, and the sixth to the rectus externus. The orbicular muscle is supplied, like most of those of the face, by the *portio dura* of the seventh pair. All these, except the optic, are muscular or motor nerves. The fifth nerve supplies the whole organ in common with many other parts with ordinary sensation. Any account of the intricate nervous constitution of the iris would be here quite out of place. The third and sixth nerves are mainly concerned in it. Thus of the ten cerebral nerves, the second, third, fourth, and sixth are wholly, and the fifth and seventh partially distributed to the organ of vision; a fact which may give some idea of the elaborate organization and varied exigencies of the parts which compose it.

Comparative Anatomy of the Eye.—The eyes of insects and many other articulated animals, often consist (as we have mentioned before) of myriads of simple eyes grouped in one compound organ. The eye of the lobster is said to contain at least 5,000. Such organs are commonly placed one on each side of the head. The horny, rounded, naked, and transparent part seen externally represents the cornea. Its surface when viewed by the microscope displays as many hexagonal *facettes* as the organ contains simple eyes. Beneath each facette is applied the base of a minute transparent cone which constitutes the lens. These cones are arranged side by side with their acute angles directed inwards to the terminations of as many fibrils of an optic nerve. A choroid pigment is spread beneath, and often separates the lenticular cones. Vestiges of the aqueous and vitreous humours are also frequently present. When the eyes are simple, as in the spiders, there are generally several, from two to twelve, placed on different parts of the head and thorax. The lens is of the usual spherical shape, hard and sparkling, and highly refractive. In fish and other aquatic animals the lens is dense, hard, and spherical, to make up in refractive power for the density of the medium through which light reaches the eye. On the other hand the cornea is flat, and there is little aqueous humour. Such provisions would be of no value; for as the refractive power of water is the same as that of aqueous humour, rays penetrating the surface, however shaped, would pass on in the direction of their entrance. Fish are unprovided with eyelids, and the eyeball has but little independent motion. There is a red gelatinous structure near the optic nerve between the layers of the choroid, the use of which is unknown. It is called the choroid gland. The ciliary body and processes are generally absent; but there is a rudiment in the eyes of fish of that part called the *pecten* in birds.

The eyeballs of quadrupeds and other mammalia resemble the human organ in structure, and differ from it, but not essentially, in form. This is not the case with the appendages. One of the most remarkable additions commonly found to the parts we have described is that of a strong retractor muscle in the shape of a hollow cone attached at the apex to the bottom of the orbit, and by the marginal base to the sclerotic, which it embraces, lying under the recti muscles. Its use is to draw back the eye in the orbit; a gesture which gives a very peculiar expression of hollowness to the organ in beasts of prey.

We subjoin the following account of the eye of the common owl (*strix bubo*), chiefly for the purpose of explaining the *pecten* and the curious mechanism of the third eyelid, or *nictitating membrane*, in birds.

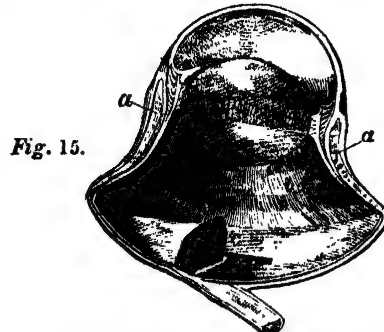


Fig. 15.

Horizontal section of the eye of an owl (strix bubo).
a a, Bony plates in the sclerotic; *b*, ciliary body; *c*, pecten.

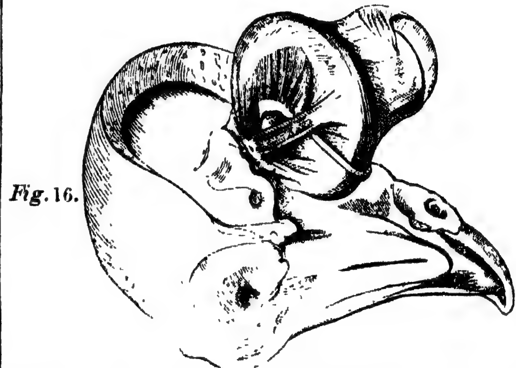


Fig. 16.

Head of the same bird. A portion of the bony margin of the orbit having been removed, the eyeball is turned forward so as to show the recti and other muscles.

The general shape of the organ represented in the annexed figures resembles a bell. This arises from the disposition of a series of quadrangular bony scales (*fig.* 15, *a*) within the substance of the sclerotic, concave on their outer aspect, and overlapping and accurately fitted to each other. The rigidity thus communicated to the external case which contains the fluid media prevents their pressure from distending the eye into a spherical shape. The ciliary body (*fig.* 15, *b*) extends over the whole of this portion of the surface. A curious membrane called the *pecten* or comb (*fig.* 15, *c*), from some resemblance to that implement, projects through the choroid into the vitreous humour, and in some birds is attached to the side of the lens. In the owl it is comparatively short. It resembles a quadrangular piece of choroid folded backwards and forwards upon itself like the paper of a lady's fan. Of its use little is known. The foramen of Soemmering, described in the account of the human retina, is thought to be a rudiment of the pecten. In birds the retina has *generally* the yellow colour seen only *partially* in man round the central spot miscalled a *foramen*.

At the back of the globe there are two muscles which originate from the sclerotic, and are applied to its curved surface round the entrance of the optic nerve (*fig.* 17, *a*). The larger represents rather more than half of what if completed would be a broad circular ring (*fig.* 17, *b*). It is called the *Quadratus*. Attached by its wider edge near the margin of this part of the sclerotic, its fibres converge to the narrower edge, and terminate in a narrow tendon (*fig.* 17, *c*), perforated through its whole length like the hem of an apron. The second smaller muscle, called the *pyramidalis* from its shape (*fig.* 17, *d*), at an opposite part of the circumference. Its fibres converge, and are fixed into a long round tendon (*figs.* 17 and 18, *e*), which passes through the loop or *hem* (*c*) of the Quadratus, and hence turning over the edge of the broad part of the sclerotic, is continued along the

Fig. 17. Fig. 18.

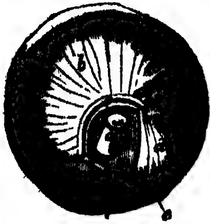




Fig. 17. Posterior view of the sclerotic of the same bird, showing the muscles of the nictitating membrane. a. Optic nerve; b, quadratus muscle; c, its looped tendon; d, pyramidalis muscle; e, its tendon—having passed through the loop in that of the quadratus—turning over the edge of the sclerotic.

Fig. 18. Lateral view of the same part. e, The tendon of the pyramidalis, attached to the concave part of the sclerotic by tendinous loops, and passing round a prominent bony tubercle, is seen inserted into the nictitating membrane at f.

surface of its bell-shaped portion, where it passes through several thread-like loops or pulleys which keep it applied to the concavity, and round a bony point which projects from the surface, and is attached near the edge of the cornea to the edge of an elastic fold (*fig.* 18, *f*) of the conjunctive which is called the third eyelid or nictitating (i. e. *winking*) membrane. It will be easily seen by the help of the figures, from this description, that the effect of the simultaneous contraction of the two muscles will be to draw the membrane with great rapidity, making it sweep over the surface of the cornea. It returns by its own elasticity with nearly equal quickness. A bird may be seen to use this mechanism twenty times in a minute; in fact, as often as it may be necessary to cleanse the surface of the eye. The colour of the membrane is milky; and it is seen to pass from the upper and inner to the outer and lower corner of the eye with the speed for which the act of *winking* is proverbial. There is a rudiment of this third eyelid in the human organ. It is a small crescentic fold of conjunctiva situated at the inner canthus behind the caruncle. (*Fig.* 13, *f*.) The *haw* is also a rudiment of it, in the eyes of quadrupeds; it is occasionally forced out by the pressure of the globe against the nasal side of the orbit, being unprovided with muscles.

Seat of Vision.—The retina in one sense is not the seat of vision. It is necessary to the perception that the impression of light should be received on another part not endowed with sensibility, namely the surface of the choroid; and that the vibration or other effect thus impressed should be transferred to the retina in front of that surface; for where the choroid is deficient at the entrance of the nerve, there is no perception of light. This may be easily shown by a very common and conclusive experiment. If two discs of white paper be fixed upon a wall at the distance of two feet from each other, and an observer, having closed one eye (the left), continues to gaze attentively at the left-hand disc, at the same time slowly retreating from the wall, he will for a time continue to see them both; the rays from the right-hand object entering of course laterally, and impinging upon the retina nearer and nearer to the entrance of the nerve as he goes backward. At length when he has reached the distance of about 6½ feet from the wall, the right-hand object will suddenly disappear, and remain invisible (the observer still retreating) till he has gained a distance of about eight feet. During this period the spectrum has been passing over the circular aperture in the choroid through which the nerve enters. The insensible portion of the retina is found to extend horizontally over five degrees and a half of the angular range of vision. The eyes are generally unequal in power, and the experiment succeeds best in the weaker organ, in which the obscuration is more sudden and complete. In the experiment previously mentioned, showing the distribution of the central artery of the retina, the surface of the choroid is faintly illuminated through the transparent nervous expansion by what is called the *dispersion* of part of the light admitted through the pupil; but the rays thus scattered are locally intercepted by the opaque blood contained in the minute branches of the artery; hence, after several repetitions, when the eye has become accustomed to neglect the taper, and attend to the fainter internal illumination, the *shadow* of the vascular net-work upon the choroid becomes perceptible in dark lines.

Apparent direction of objects seen obliquely.—A body in motion, as a ball, striking the surface of another, impresses it in a line perpendicular to the surface at the point of impact. This rule appears to hold good with respect to the action of light upon the retina. Indeed if impressions of any kind be made upon it, the sensation is that of light, and the direction suggested is that of a line joining the centre of the sphere of which the retina forms a part with the point impressed,—in other words, a line perpendicular to it. This may be shown in several ways: if we excite the nerve by pressing far back upon the eyeball with the finger nail, especially if the eye be closed or light otherwise excluded, a bright ring appears to be seen in a diametrically opposite quarter.

Erect Vision.—If the sclerotic and choroid be carefully removed under water from the back of an eye, an inverted picture of any object held before the cornea is seen upon the now milky surface of the retina. Hence the celebrated question raised in the age of philosophical barbarism, how is it that we see objects erect when the image on the retina is inverted? The question is an idle one, which is perhaps hardly worth answering. The mind judges of the apparent place of objects or of parts of an object by the *direction* of the impressions made upon the retina, not by the part of it which may happen to be affected by these impressions. The shadow of the central artery is an example of an impression necessarily received always upon the same parts; yet the *apparent*, or in other words the *relative*, place of the shadow will be found to vary with every movement of the eye.

Single Vision.—Another question, not so trivial as the last, has been raised with respect to single vision with *two* eyes, as the impression must be twofold. But perhaps it will not require an answer if the reader will try to imagine double vision of the same object, or rather of the same *point*, for the question resolves itself into that. Let the two supposed images approach each other, still remaining double, till they are in contact. Another step in the imaginary approximation, and they are one. The truth is, that both eyes see the object in the same place; and as two images, no more than two material substances, can occupy the same place at the same time, the impressions coincide and are single.

Diseases of the Eye.—We shall content ourselves in speaking of the diseases of the eye, with a few remarks which may serve as an index to the separate articles upon the most important of those diseases.

Blindness may be produced in various degrees by injury or disease of the retina, as by lightning. Such affections are technically known as *amaurosis*, but will be mentioned under the more familiar title of GUTTA SERENA. The sight may also be lost by anything which destroys the transparency of any of the refracting media. [CATARACT; GLAUCOMA; LEUCOMA.] Closure of the pupil is of course attended with loss of vision. It arises from diseases of the iris and may sometimes be remedied by an operation. Information with respect to inflammations and other diseases of the iris, sclerotic, and choroid, will be found under GOUT; IRITIS; PUPIL, ARTIFICIAL; RHEUMATISM; SYPHILIS. Inflammatory and ulcerative affections of the conjunctiva, whether of the eye or lid, are called OPHTHALMIA. The diseases of the lachrymal organs, and a peculiar paralytic affection of the muscle which elevates the upper eyelid will be mentioned respectively under the heads of FISTULA LACHRYMALIS and PTOSIS. Almost all affections of the eye, whether they result from injury or spontaneously, are liable to be extended from one eye to the other, so close is the sympathy between these organs. When the contents of the eyeball have been by any means evacuated, which may arise either from accident or disease, or operations which disease sometimes renders necessary, the sclerotic shrinks into a tubercle at the bottom of the eye, which produces of course a very unsightly effect, as well as no little inconvenience. It is common in these cases to resort to the introduction of what is called an artificial eye, consisting of a smooth shell of glass or enamel, suited in size and shape to the circumstances of the case, and coloured in exact imitation of the remaining organ. It is difficult when this is well made to distinguish it from a natural eye, and the illusion is much more complete from the circumstance that the muscles, still attached to the shrunk sclerotic, are capable of moving the artificial eye in correspondence with the other to an extent which would hardly be believed.

EYE (in Optics). [LIGHT; OPTICS.]

EYE, in horticulture, the name technically given to the bud of a plant.

EYE. [SUFFOLK.]

EYEMOUTH. [BERWICKSHIRE.]

EYLAU, more properly **PREUSSISCH-EILAU** (Prussian Eilau), is a circle in the Prussian administrative circle of Königsberg, having an area of about 460 square miles, which is partially wooded, is well cultivated, and has good pasture land and productive fisheries on its western boundary, the Frische Haff. Population about 37,000.

Preussisch-Eilau, the chief town, built in 1336, is situated on the Pasmer, in 54° 25′ N. lat. and 20° 35′ E. long. It has an old castle, a church, about 200 houses, and about 2150 inhabitants, who manufacture woollen cloths, hats, leather, &c. The name it bears has been given to it in order to distinguish it from Deutsch-Eilau, a town in the Prussian administrative circle of Marienwerder. An obstinate engagement took place near Preussisch-Eilau between the French forces under Napoleon and the Russian under Bennigsen on the 7th and 8th February, 1807. After the combatants had lost 30,000 in killed and 50,000 in wounded, they withdrew their troops from the field.

EYRE (from the old French *eyre*, a journey), the court of the justices itinerant who were regularly established, if not first appointed by the parliament of Northampton, A.D. 1176—22 Hen. II.—with a delegated power from the king's great court, or Aula Regis, being looked upon as members thereof. They were first appointed to make their circuit round the kingdom once in seven years, but by Magna Charta, c. 12, it was provided that they should be sent into every county once a year. Their jurisdiction and mode of proceeding are laid down 4 Inst., 184. These judges itinerant have been long superseded by the modern justices of assize. There was also a court so called which was held before the chief justices of the several forests, under the old Forest Laws. These courts were instituted A.D. 1184 by Hen. II., and were formerly very regularly held; but the last of any note that was holden was in the reign of Charles I., before the Earl of Holland, the rigorous proceedings at which are reported by Sir William Jones (Jones, i. 266). Charles I. endeavoured to make these odious forest laws a source of revenue independent of the parliament; and though, after the Restoration, another Court of Eyre was held before the earl of Oxford (North's *Life of Lord Guildford*, 45), it was merely *pro formâ*, and since the Revolution, 1688, they have fallen into total disuse. There are still two officers appointed by letters patent (4 Inst. 291), who are called Chief Justices in Eyre, the one south, the other north, of Trent, whose deputies perform some trifling and harmless functions connected with the royal forests in their respective districts:—the offices themselves are sinecures.

EZEKIEL, the Book of the Prophet, is a canonical book of the Old Testament, divided, in our English version, into 48 chapters, and placed next after Jeremiah's Book of Lamentations, and before the book of Daniel. Ezekiel was partially contemporaneous with Jeremiah, and is one of the prophets called 'The Greater,' a distinction which relates to the comparative magnitude and importance of their books. He was a priest, the son of Buzi (i. 3), and, according to the account of his life ascribed (erroneously) to Epiphanius, he was born at a place called Saresa. In the first Babylonian captivity he was carried away by Nebuchadnezzar into Mesopotamia, with the Kings Jeconiah and Jehoiachim, and all the principal inhabitants of Jerusalem, who were stationed at Tel-abib (iii. 15) and at other places on the river Chebar (i. 1, 3), the Chaboras of Ptolemy, which flows into the east side of the Euphrates at Carchemish, about 300 miles north-west of Babylon. He is stated to have commenced his prophesying in the fifth year of his captivity (i. 2), about B.C. 598, and to have continued it during more than 22 years, that is, until the fourteenth year after the destruction of Jerusalem by Nebuchadnezzar. The pseudo-Epiphanius says that Ezekiel, on account of his aversion to adopt the Chaldæan idolatry, was put to death by the Jewish prince or commander of the captives. Rabbi Benjamin of Tudela states that his tomb is between the Euphrates and the Chebar, in a vault built by King Jehoiachim, and that within it the Jews keep a lamp perpetually burning. The same writer asserts, with equal appearance of traditional falsehood, that the Jews possess the book of Ezekiel in the original autograph, which they read every year on the great day of expiation. Greatly inconsistent with such veneration is the fact related by Calmet, that the Jews speak of this prophet very contemptuously as having been Jeremiah's servant boy, and the object of popular ridicule and raillery, whence his name 'son of Buzi' (בוז *buz*, contempt). Josephus speaks of two books of Ezekiel, but commentators understand him to mean the present book, divided at the end of chapter xxxix., for the nine remaining chapters are distinctly different with regard both to subject and style. The first 39 chapters are occupied with the prophet's highly poetic and impassioned announcement of God's wrath and vengeance against the rebellious idolatry, perverseness, and sensuality of the Jews, as well as against their enemies, the surrounding nations. All this portion is replete with dreadful pictures of the calamities of war—of ruin, desolation, death, and destruction—slaughter, pestilence, famine, and every imaginable state of misery; but in the nine chapters of the latter portion the prophet describes, in a more prosaic style, his visions of the new temple and city of Jerusalem. In visionary presence he walks about the holy metropolis of Judæa as raised from its ruins in which it was left by the Chaldæan conqueror, and restored to the splendor which it displayed in the reign of Solomon. He measures and observes minutely all the dimensions of the Temple and city; gives directions for the celebration of sacrificial rites, feasts, and ceremonies; partitions the country among the several tribes; and enumerates the duties of priests, king, and people. Dr. A. Clarke, in his edition of the Bible, gives a plate of the Temple according to Ezekiel's description, and a map of Judæa as allotted by this prophet to the different tribes. A full and particular analysis of the contents of the whole 48 chapters is given in Mr. Horne's 'Introduction to the Bible.' The following is a brief and general survey. Chapters i. to iii. (and see chap. 10) describe the vision of the wheels and cherubim, called 'Jehovah's Chariot,' and the prophet's reception of the divine instructions and commission. Chapters iv. to xxiv. reiterate reproaches and denunciations against the Israelites and their prophets, announcing, in various visions and parables, the numerous calamities about to come upon them as a punishment of their rebellious idolatry and depravity. The species of idolatry adopted by the Jews in preference to the religious system of Moses appears, by the declarations of Ezekiel and the other prophets, to have been Sabism, or the worship of the sun on high places planted with trees. (See chapters viii. xiv. xvi. xvii. xx. xxviii. &c.) Dr. A. Clarke quotes Palladius 'De Re Rustica' to show that the 'tile' (iv. 1) on which the prophet portrayed the city of Jerusalem was a brick, two feet long and one foot broad, and he supposes that the mimic apparatus of war (v. 2) were made by the prophet with clay. The 390 years signified by the prophet's lying as many days (v. 4 and 5) on his left side, are said by biblical chronologists to be the period from B.C. 970 to 580; and the 40 years signified by his lying 40 days on his right side (v. 6) is the period from B.C. 580 to 540. Concerning the fact of baking bread with human and other excrement (v. 12 and 15), see Calmet's Dict. by Taylor, vol. iii.; Fragments, p. 9, &c., where the oriental custom of using dung for fuel is explained. Chapters xxiv. to xxxii. declare the dreadful judgments of God against the enemies of the Jews, namely, the surrounding nations of Ammonites, Moabites, Edomites, and Philistines; against the cities of Tyre and Zidon; and against all the land of Egypt. It may suffice to remark here that all these manifestations of the divine anger towards the nations of Palestine, Phœnicia, and Egypt, relate to the slaughter and devastation which attended the conquests of Nebuchadnezzar, king of Babylon; and that in order properly to understand the prophet's descriptions, it is necessary to consider particularly the circumstances and character of the Jews, and all the collateral history of the period. Of these an abstract is given by Bishop Newcome in the Introduction to his Translation of Ezekiel, and more particular and critical accounts are supplied in the scholia and prolegomena of the various commentators named at the end of the article.

Chapters xxxiii. to xxxvii. are occupied with declarations of the justice and forgiveness of God to the repentant—the fall of Jerusalem—a severe rebuke (chap. xxxiv.) of the avarice, idleness, and cruelty of the shepherds or priests of Israel—and consolatory promises of the people's restoration and return to Palestine. Chapters xxxviii. and xxxix. contain the Prophecy of Gog and Magog; and the nine concluding chapters, as already

stated, contain the prophet's visions of the temple and city of Jerusalem—their dimensions, structure, embellishments, &c.—the ceremonial arrangements of the hierarchy, and the allotment of the land of Judæa among the several tribes on their return from captivity. The subject matter of Ezekiel is, for the most part, identical with that of his contemporary Jeremiah, and much similarity is observable in their declarations. The conquests and devastations of Nebuchadnezzar form the principal theme of each; but Ezekiel views them chiefly as affecting Israel, while Jeremiah describes them with especial reference to Judah. Both declaim with vehement indignation against the depravity of the priests, and against the 'lying divinations' of the prophets who sought to induce the people to shake off their Babylonian slavery. (Compare Jeremiah, chapters xxiii., xxvii., xxviii., xxix. with Ezekiel, chapters xiii., xxxiv.) Parts of the book of Revelations may be compared with some portions of Ezekiel: Rev. iv. with Ezek. i. and x., respecting the cherubim with wings full of eyes; and Rev. xi., xxi., xxii., with Ezek. xl. to xliii., describing the New Jerusalem.

That Ezekiel is a very obscure writer is asserted by all who have attempted to explain his prophecies. The antient Jews considered them as inexplicable, and the council of the Sanhedrim once deliberated long on the propriety of excluding them, on this account, from the canon (Calmet, præf. ad Ezech.); but to prevent this exclusion Rabbi Ananias undertook to explain completely the vision of Jehovah's chariot (i. and x.). His proposal was accepted by the council, and in order to enable him to accomplish his task without interruption they furnished him with 300 barrels of oil to supply his lamp during the course of his studies. Dr. Adam Clarke relates this marvellous anecdote in his Comment on the Bible, and in repeating it in his 'Succession of Sacred Literature,' he says the quantity of oil was 300 *tons*. It was also alleged as a reason for rejecting Ezekiel from the canon that he teaches, in direct contradiction to the Mosaic doctrine, that children shall *not* suffer punishment for the offences of their parents (xviii., 2-20). (See Hueti 'Demonstratio Evang., prop. 4, de Prophet. Ezech.') St. Jerome considers Ezekiel's visions and expressions very difficult to be understood, and says that no one under the age of 30 was permitted to read them. (Hieron. procm. in lib. Ezech.) It is astonishing, says Dr. Clarke, how difficult it is to settle the text by a collation of MSS.; and, in accordance with the opinion of many other interpreters, he adds, that much remains to be done to restore the original Hebrew text to a state of purity. Michaelis, Eichhorn, Newcome, and many other commentators, have written copiously on the peculiarities of Ezekiel's style. Grotius (Præf. ad Ezech.) speaks of it with the highest admiration, and compares the prophet to Homer. Michaelis admits its bold and striking originality, but denies that sublimity is any part of its character, though the passion of terror is highly excited. Bishop Lowth (Prælect. Heb. Poet.) regards Ezekiel as bold, vehement, tragical; wholly intent on exaggeration; in sentiment fervid, bitter, indignant; in imagery magnificent, harsh, and almost deformed; in diction grand, austere, rough, rude, uncultivated; abounding in repetitions from indignation and violence. This eminent judge of Hebrew literature assigns to the poetry of Ezekiel the same rank among the Jewish writers as that of Æschylus among the Greeks; and in speaking of the great obscurity of his visions, he believes it to consist not so much in the language as in the conception. Eichhorn (the peculiar character of whose criticism we have noticed under that article) regards the Book of Ezekiel as a series of highly-wrought and extremely artificial poetical pictures. No other prophet, he says, has given such freedom to imagination. 'Every thing is dressed in fables, allegories, and visionary poetry. He is so used to ecstasies and visionaries that he adopts their appropriate language when he has no vision to describe.' In accordance with the doctrines of the German rationalism he considers the prophecies as nothing more than the poetical fictions of a heated oriental imagination of a similar nature with the poetry of the book of Revelations. A remarkable characteristic of the poems of Ezekiel, observes the same critic, is the painful detail and minuteness of his descriptions. He considers the prophet as a great original poet, but from his turgid and hyperbolical style he assigns him to the *silver* age of Hebrew literature.

In rude indignation, violent energy, and disregard of delicacy and disguise, the denunciations and descriptions of Ezekiel are said by Dr. Clarke to resemble the satires of Juvenal. The same character of thought and expression is exhibited in the writings of the two other Greater Prophets, Isaiah and Jeremiah. (Compare Ezek. xvi. 4 to 37; xxiii. 17-21; Isaiah, xxviii. 7, 8; xxxvi. 12. Ezekiel's remarkable prophecy of Gog and Magog, xxxviii. and xxxix., has always been a subject of learned controversy, and the explanations are nearly as numerous as the expositors. However, only two appear to possess any considerable probability. Gog, according to the first, was Antiochus Epiphanes; according to the second, he was Cambyses, king of Persia. In modern times it has been elaborately shown by Mr. Granville Penn that Gog is to be recognized in the person of the Emperor Napoleon, and Magog in the people or nation of France. His treatise on the subject, entitled 'The Prophecy of Ezekiel, concerning Gogue, the last tyrant of the church,' &c., published in 1815, is a production replete with curious learning and argumentative ingenuity.

(*Commentaries* of Bauer, Doederlein, Hezel, Michaelis; Dathe, *Prophetæ Majores*, 1785; Dr. Seiler, *Ueber die Weissagungen und ihre Erfüllung*, 1795; Volborth, *Ezechiel aufs neue aus dem Hebräischen übersetzt*, 1787; Bishop Newcome's *Improved Version, Metrical Arrangement, and Explanation of Ezekiel*, 4to., 1788; Venemæ *Lectiones Academicæ ad Ezechielem*, 2 vols., 4to., 1791; Rosenmüller, *Scholia in Ezechielem*, 2 vols., 4to., 1826; Agier, *Les Prophètes nouvellement traduits sur l'Hebreu, avec des Explications et Notes Critiques*, 10 vols., 8vo., 1822; Noyes, *New Translation of the Prophets in Chronological Order*, 1833, Boston; Keith *On Prophecy*; Eichhorn's *Einleitung in das Alte Test.*, vol. iii.; Beverley, *Visions of Ezekiel*, 4to.; Prideaux's *Connection*, vol. i.; Bishop Lowth's *Prelectiones*: Dr. Gill's *Exposition of the Prophets*, 2 vols. fol. 1757; Bishop Lowth's *Comment. on the Prophets*, 4to. 1822; Greenhill's *Exposition of Ezekiel*, 5 vols. 4to. 1649. The most learned and elaborate commentary on Ezekiel is by two Spanish Jesuits, Pradus and Villalpandus, in 3 vols., folio.)

EZEKIEL. [DRAMATIC ART AND LITERATURE.]

EZRA, the Book of, is a canonical book of the Old Testament, placed next after the second book of Chronicles and before the book of Nehemiah, and, in the English version, is divided into ten chapters. By Jews and Christians it has generally been attributed to the priest whose name it bears, chiefly because throughout chapters viii. and ix. the actions of Ezra are related in the first person. He is supposed to have written the two books of Chronicles and the book of Esther. It is remarkable that the first two verses of Ezra and a part of the third form the conclusion of the second book of Chronicles. [CHRONICLES.] Ezra, Esdras, or Esdra in the Hebrew is עזרה, *azrh*, signifying 'help' or 'succour.' His genealogy up to Aaron is given in chap. vii. 1-5. In verses 6 and 11 he is said to have been a priest and ready scribe of the words of the law of Moses; and he appears to have been an able and important agent in the principal events of his age and nation. The prophets Haggai and Zechariah were contemporary with Ezra. (Compare Hagg. i. 12, Zech. iii. 4, and Ezra v.) There are four books of Ezra so called; namely, the canonical one bearing his name, the book of Nehemiah, which by the antient Jews and by the Greek and Roman churches is considered as the second book of Ezra, and two books of Ezra or Esdras in the Apocrypha. The first of the two apocryphal books contains the substance of the canonical one, with many circumstantial additions, and in the Greek church it is read as canonical; but the second exhibits a more decided appearance of fiction, and by no church is regarded as a work of inspiration, though it is cited by several of the antient fathers. The first six chapters of the canonical book are regarded by some biblical critics as improperly ascribed to Ezra, for between the event with which the seventh chapter commences, that is, the commission from Artaxerxes Longimanus, in the seventh year of his reign, to Ezra to go up to Jerusalem, B.C. 458, and that which terminates the sixth chapter, namely, the completion of the second temple, in the sixth year of the reign of Darius Hystaspes, B.C. 516, there is a chasm of fifty-eight years. The events recorded in the whole ten chapters of the canonical book of Ezra embrace a period of ninety-one years, that is, from the edict of Cyrus issued in the first year of his reign, B.C. 536, for the return of the captive Jews to Jerusalem, to the termi-

nation of Ezra's government by the mission of Nehemiah to Jerusalem from Artaxerxes Longimanus, in the twentieth year of his reign, B.C. 445. As Daniel's seventy prophetic weeks commence at the going forth of the edict of Cyrus to Zerubbabel or of that of Artaxerxes to Ezra, these events have been the subject of much critical investigation among biblical critics.

The contents of the first six chapters are briefly as follow. Chap. i. gives an account of the proclamation of Cyrus concerning his release of the captive Jews, permitting them to go from Babylon to Jerusalem to rebuild the temple; of the restoration of their property, sacred vessels and utensils; and of presents made by the Chaldæans of money and various provisions. Chap. ii. states the numbers of each of the families composing the multitude which returned to Judæa with Zerubbabel, and the number of their beasts of burden. All this account, excepting some of the numbers, is repeated word for word in the seventh chapter of Nehemiah, beginning at ver. 6. In ver. 64 and 65 of Ezra, the total number of the people is said to have been 42,360, which appears not to agree with the preceding particulars, since the addition of these produces only 29,818, that is, a deficiency of 12,542. The numbers given in Nehemiah occasionally differ very widely from those in Ezra: for instance, the children of Azgad are said in Ezra (ii. 12) to have been 1222; but in Nehemiah (vii. 17) they are said to have been 2322, or 1100 more. Nehemiah repeats precisely the total given by Ezra, 42,360; but the addition of Nehemiah's particular numbers makes 31,089, or a deficiency of 11,271. The numbers of horses, 736, mules 245, camels 435, and asses 6,720, exactly agree in the two accounts; but in Ezra, ver. 69, the chief fathers give to the treasury 61,000 drams of gold; in Nehemiah, ver. 71, they give only 20,000. Chap. iii. records the events of setting up the altar at Jerusalem and re-establishing the Jewish sacrificial worship. An account of the interruption of the building of the Temple by the decree of Artaxerxes, and its completion by a subsequent decree of the same monarch, with transcripts of the documents written on these occasions, occupy chapters iv., v., and vi. Chapters vii. and viii. contain an account of Ezra's commission from Artaxerxes to undertake the government of Judæa, his preparations and reception of presents for his journey thither, with a multitude of Jews, who it appears still remained in Babylon after the return to Judæa of the multitude under Zerubbabel; an enumeration of the people and families who returned, and the weight of gold and silver contributed by the king, his councillors, and the Israelites, for the use of the Temple at Jerusalem (viii. 25-28). The value of these presents amounts to 803,600*l*. Chapters ix. and x. relate the proceedings of Ezra in separating from their wives and children all the Israelites who had married women from among the surrounding nations, and thus 'mingled the holy seed with the abominations of the Gentiles.' Ezra (x. 3, 5, 19, 44) made all the Israelites who had 'strange wives and children' swear, and give their hands, that they would put them away, which accordingly was done. The latter half of the last chapter contains a long list of the husbands and fathers who were the subjects of this national renovation. The part from iv. 8 to vii. 27 is written in the Chaldee idiom, the rest in Hebrew. The period to which the four last chapters relate, comprising the Jewish history from B.C. 458 to B.C. 445, is coeval with the age of Pericles. The subject matter of the book of Nehemiah being identical with that of Ezra, the collation of the two affords a mutual illustration. Chapter viii. of Nehemiah relates circumstantially the fact of Ezra's solemn reading and exposition of the law to the assembled Israelites, who, according to Dr. Prideaux, were taught the signification of the Hebrew words by means of Chaldaic interpreters (8); for, since their seventy years' captivity in Babylon, the Chaldee instead of the Hebrew had become their vernacular language. (Dean Prideaux's *Connection*, fol., p. 263.) The critical arguments adduced in opposition to the opinion that the Israelites lost the Hebrew language, and understood only the Chaldæan, are well exhibited in Dr. Gill's learned 'Dissertation on the Antiquity of the Hebrew Language,' 8vo., 1767. The two principal undertakings of Ezra were—1. The restoration of the Jewish law and ritual, according to the modes observed before the captivity; and 2. The collection and rectification of the Sacred Scriptures. On account of these important services the Jews regarded him as a second Moses. It was commonly believed by the antient fathers of the Christian church that all the Sacred Scriptures of the Jews were entirely destroyed in the conflagration of the temple and city of Jerusalem by the king of Babylon, and that, on the return of the Jews from the Chaldæan captivity, these writings were wholly reproduced by a divine inspiration of Ezra. (See Irenæus, *Adversus Hæres*, l. iii. c. 25; Tertullian, *De Habitu Mulierum*, c. iii.; Clemens Alexandrinus, *Strom.* i.; Basil, *in Epist. ad Chilonem*.) The following passages from the second Apocryphal book of Ezra, xiv. 26, 45, 46, 47, appear to sanction this opinion. 'Behold, Lord,' says Ezra, 'I will go as thou hast commanded me, and reprove the people. The world is set in darkness, and they that dwell therein are without light, for *thy law is burnt;* therefore no man knoweth the things that are done of thee; but if I have found grace before thee, send the Holy Ghost into me, and I shall write all things that have been done in the world since the beginning, which were written in the law; And God said, Go, prepare to write swiftly, and when thou hast done, some things shalt thou publish, and some things shalt thou show secretly to the wise.' The learned Dr. Prideaux (*Connection*, p. 260, fol.) remarks, that 'in the time of king Josiah (B.C. 640), through the impiety of the two preceding reigns of Manasseh and Ammon (a period of sixty years), the book of the law was so destroyed and lost; that, besides the copy of it which Hilkiah, the high-priest, accidentally found in the Temple (2 Kings xxii. 8, &c.; 2 Chron. xxxiv. 14, &c.), there was then no other to be had; for Hilkiah's surprise in finding it, and Josiah's grief in hearing it read, do plainly show that neither of them had ever seen it before; and if this pious king and the high-priest were without it, it cannot be thought that any one else had it.' If this were the authentic copy laid up before the Lord in the Temple, it was burned, as believed by all Jewish and Christian writers, in the burning of the Temple, fifty-two years afterwards, by Nebuchadnezzar. Dr. Prideaux takes it to be implied in several passages which he cites that, from the copy accidentally found by the high-priest Hilkiah, some transcriptions were made previous to the destruction of the Temple, and that from these scattered copies Ezra formed his improved edition of the sacred text. In common with most other modern divines, he rejects the opinion of the fathers respecting the restoration of the Scriptures by a new revelation to Ezra, observing (p. 261) that 'it would very much shock the faith of many should it be held that the sacred writings owe their present being to such a revival; it being obvious for sceptical persons to object that he who is said thus to have revived them forged the whole.' All, he continues, that Ezra did was—'he got together as many copies of the sacred writings as he could, and out of them all he set forth a corrected edition, in which he took care of the following particulars:—1. He corrected all the errors introduced into these copies by the negligence or mistakes of transcribers; for, by comparing them, he found out the true reading, and set all to rights. 2. He collected together all the books of which the sacred Scriptures did then consist, disposed them in proper order, and settled the canon of scripture up to that time.' The Jewish writers state that the canon was decided by a congress of 120 elders under the presidency of Ezra; but since they mention as members of it, not only the contemporaries of Ezra, as Daniel, Shadrach, Meschech, and Abednego, but the high-priest Simon the Just, who lived 250 years later, it is evident that they mean the number of those who *successively* arranged and rectified the canonical books. Ezra divided all the books he collected into three parts; the law, that is, the Pentateuch; the prophets, containing all the historical and prophetical books; and the hagiographa, which comprised all the writings not included in the two other divisions. (Josephus, *advers. Apion.*) He divided the Pentateuch into 54 sections, one of which was read every Sabbath; and, according to the Jewish authorities, he was also the author of the smaller divisions called Pesukim, or verses, and of the various readings and suggested corrections inserted in the margins of the Hebrew copies. These, called Keri Cetib (that which is read and that which is written), appear however in the books attributed to Ezra himself. (On these particulars see the remarks of Prideaux; Buxtorf, *Vindiciæ Veritatis Hebraicæ*, par. ii. c. 4; Walton's *Prolegom.*, viii. § 18; and Dr. Gill's *Dissertation on the Hebrew Language.*) Most biblical critics state that Ezra changed the antient names of places for those by which these places were known

in his time, and some say that he wrote out all the Scriptures in the Chaldee character, which alone was used and understood by the Jews after the Chaldæan captivity. Whether Ezra added the vowel-points, and whether they were invented by the Masorite grammarians at a period far posterior to the rise of Christianity, are subjects of great controversy among Hebrew critics. A concise and able view of this dispute is contained in Houbigant's 'Racines Hebraiques,' 1732. The Jewish commentators assert that all the rules and observances preserved by tradition from the time anterior to the captivity were carefully collected by Ezra, and that having reviewed them, those which he sanctioned by his authority henceforth constituted the oral law, in contradistinction to that which is written; the church of Jerusalem, like the church of Rome, regarding Scripture and tradition of equal authority, and believing the latter to be highly necessary for clearing the obscurities, supplying the defects, and solving the difficulties of the former. (See the Rabbinical authorities cited by Dr. Prideaux.) It is a theory suggested by this learned divine, and since adopted by many others, that all the numerous passages of the Hebrew Scriptures which involve chronological inconsistencies were interpolations made by Ezra, and that this is the only possible way to solve the difficulties which arise from considering the several books as the productions of the persons to whom they are commonly ascribed. The Book of Ezra, with the two Books of Chronicles, Nehemiah, Esther, and Malachi, are supposed by Dr. Prideaux to have been added to the sacred canon by the high-priest Simon the Just, in the year B.C. 150.

INDEX TO THE LETTER E.

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F.

F is a labio-dental aspirate bearing the same relation to the other labio-dental aspirate V which the letters called *tenues*, *p*, *k*, *t*, bear to the *mediæ*, *b*, *g*, *d*. It occupies the sixth place in the English as in the Latin alphabet, thus corresponding with the digamma of the old Greek alphabet, and the vau of the Hebrew. In power and form it is likewise closely related to those two letters. [ALPHABET.]

The letter F is interchangeable with the other aspirates *ch* or *h* and *th*, and also with the lip-letters *p* and *b*.

1. F in Latin corresponds to *h* in Spanish, as Latin *formoso*, beautiful; Spanish *hermoso;* Latin *femina*, female; Spanish *hembra;* Latin *fugere*, fly; Spanish *huir*. Other examples may readily be found in a Spanish Dictionary under the letter *h*. The same change prevailed between the Latin of Rome and the Sabine dialect of that language.

2. F in Latin corresponds to *th* in Greek, as Latin *fera*, a wild beast; Greek *θηρ*. Latin *fle*, weep; Greek *θρε*, as seen in *θρηνος*. Indeed this interchange prevailed among the dialects of the Greek language itself as in *ουφαρ* and *ουθαρ*; *φλαν* and *θλαν*; *φλιβω* and *θλιβω*. This however seems to depend on the proximity of the letters *l* and *r*. (See L.)

3. F in Latin corresponds to *b* in German and English, as *frang-ere*, brech-en, to break; *frater*, bruder, brother; *fago*, buche, beech, &c.

4. F in English and German to *p* in Latin, as *pelli*, fell, fell (comp. fellmonger); *ped*, fuss, foot; *pug-na-re*, fechten, to fight, &c.

F, in Music, is the fourth note, or degree, of the diatonic scale, answering to the *fa* of the Italians and French. It was originally used as the base clef, to which it gives a name; but while serving as a sign, time has gradually altered its form into that which as a clef it now takes. This letter is also an abbreviation of the Italian word *Forte*, strong, or loud. The double F signifies the superlative of *Forte*,—*Fortissimo*.

FABA'CEÆ. [LEGUMINOSÆ.]

FA'BIUS MA'XIMUS and the FABII FAMILY. The Fabii were a numerous and powerful gens or patrician house of antient Rome, which became subdivided into several families or branches distinguished by their respective cognomina, such as Fabii Maximi, Fabii Ambusti, Fabii Vibulani, &c. They were of Sabine origin, and settled on the Quirinal from the time of the earliest kings. After the expulsion of the Tarquinii, the Fabii as one of the older houses exercised considerable influence in the senate. Cæso Fabius being Quæstor with L. Valerius, impeached Spurius Cassius in the year of Rome 268, 486 B.C., and had him executed. It has been noted as a remarkable fact, that for seven consecutive years from that time, one of the two annual consulships was filled by three brothers Fabii in rotation. Niebuhr has particularly investigated this period of Roman history, and speculated on the causes of this long retention of office by the Fabii as connected with the struggle then pending between the patricians and the plebeians, and the attempt of the former to monopolize the elections. (*History of Rome*, vol. ii., *The Seven Consulships of the Fabii*.) One of the three brothers, Quintus Fabius Vibulanus, fell in battle against the Veientes, in the year 274 of Rome. In the following year, under the consulship of Cæso Fabius and Titus Virginius, the whole house of the Fabii proposed to leave Rome and settle on the borders of the territory of Veii, in order to take the war against the Veientes entirely into their hands. After performing solemn sacrifices, they left Rome in a body, mustering 306 patricians, besides their families, clients, and freedmen, and encamped on the banks of the Cremera in sight of Veii. There they forti ed themselves, and maintained for nearly two years a harassing warfare against the Veientes and other people of Etruria. At last in one of their predatory incursions they fell into an ambuscade, and fighting desperately, were all exterminated. (Livy, ii. 48. 50; and Niebuhr's *History, on the Veientine War*.) One only of the house, Quintus Fabius Vibulanus, who had remained at Rome, escaped, and became the parent stock of all the subsequent Fabii. He was repeatedly consul, and was afterwards one of the decemviri with Appius Claudius for two consecutive years, in which office he disgraced himself by his connivance at the oppressions of his colleague, which caused the fall of the decemvirate. In subsequent years we find several Fabii filling the consulship, until we come to M. Fabius Ambustus, who was consul in the year 393 of Rome, and again several times after. He fought against the Hernici and the Tarquinians, and left several sons, one of whom, known by the name of Quintus Fabius Maximus Rullianus, attacked and defeated the Samnites (429 of Rome) in the absence and against the orders of his commanding officer, the Dictator Papirius, who would have brought him to punishment for disobedience, but was prevented by the intercession of the soldiers and the people. This Fabius was five times consul, and dictator twice. He triumphed over the Samnites, Marsi, Gauls, and Tuscans. His son, Quintus Fabius Gurges, was thrice consul, and was the grandfather of QUINTUS FABIUS MAXIMUS VERRUCOSUS, one of the most celebrated generals of Rome. In his first consulate he triumphed over the Ligurians. After the Thrasymenian defeat he was named Prodictator by the unanimous voice of the people, and was intrusted with the salvation of the Republic. The system which he adopted to check the advance of Hannibal is well known. By a succession of skilful movements, marches, and counter-marches, always choosing good defensive positions, he harassed his antagonist, who could never draw him into ground favourable for his attack, while Fabius watched every opportunity of availing himself of any error or neglect on the part of the Carthaginians.

This mode of warfare, which was new to the Romans, acquired for Fabius the name of Cunctator, or 'temporizer,' and was censured by the young, the rash, and the ignorant; but it probably was the means of saving Rome from ruin. Minucius, who shared with Fabius the command of the army, having imprudently engaged Hannibal, was saved from total destruction by the timely assistance of the dictator. In the following year however, 536 of Rome, Fabius being recalled to Rome, the command of the army was intrusted to the consul T. Varro, who rushed imprudently to battle, when the defeat of Cannæ made manifest the wisdom of the dictator's previous caution. Fabius was made consul in the next year, and was again employed in keeping Hannibal in check. In 543 of Rome, being consul for the fifth time, he re-took Tarentum by stratagem, after which he narrowly escaped being caught himself in a snare by Hannibal near Metapontum. (Livy, xxvii. 15, 16.) When some years after the question was discussed in the senate of sending P. Scipio with an army into Africa, Fabius opposed it, saying that Italy ought first to be rid of Hannibal. Fabius died some time after at a very advanced age. His son, called likewise Quintus Fabius Maximus, who had also been consul, died before him. His grandson Quintus Fabius Maximus Servilianus, being proconsul, fought against Viriatus in Spain, and concluded with him an honourable peace. (Livy, *Epitome*, 54.) He was afterwards consul repeatedly, and also censor. He wrote Annals, which are quoted by Macrobius. (*Saturn.* i. 16.) His brother by adoption Quintus Fabius Maximus Æmilianus, the son of Paulus Æmilius (Livy, xlv. 41), was consul in 609 of Rome, and was the father of Fabius, called Allobrogicus, who subdued not only the Allobroges, but also the people of Southern Gaul, which he reduced into a Roman province, called from that time 'provincia,' or 'Gallia ulterior.' Quintus Fabius Maximus, a grandson of Fabius Maximus Servilianus, served in Spain under Julius Cæsar, and was made consul in the year 709 of Rome. Two of his sons or nephews, Paulus Fabius Maximus and Quintus Fabius Maximus were consuls in succession under Augustus. There was also a Fabius consul under Tiberius. Panvinius and others have reckoned that during a period of about five centuries, from the time of the first Fabius, who is mentioned as consul, to the reign of Tiberius, 48 consulships, 7 dictatorships, 8 censorships, 7 augurships, besides the offices of master of the horse and military tribune with consular power, were filled by individuals of the Fabian house. It also could boast of thirteen triumphs and two ovations. (Augustinus *de Familiis Romanorum*.)

FA'BIUS PICTOR, the historian, was descended from Marcus Fabius Ambustus, the consul. Caius Fabius, one of the sons of Ambustus, was called Pictor, because about B.C. 304 he painted the temple of the goddess of health, which painting existed till the reign of Claudius, when the temple was burnt. (Pliny, xxxv. c. 4.) The surname of Pictor was continued to his children, one of whom, Caius Fabius Pictor, was consul with Ogulnius Gallus B.C. 271, and was the father of the historian. Quintus Fabius Pictor, the historian, lived in the time of the second Punic war, according to the testimony of Livy (xxi.), who says, in speaking of the battle of the Thrasymene lake, that he followed in his narrative the authority of Fabius Pictor, who was contemporary with that memorable event. Fabius appears, from the testimony of Dionysius and Cicero, to have written both in Greek and in Latin. Of the extracts from or references to his 'Annals,' which have been transmitted to us, some concern the antiquities of Italy, and the beginning of Rome, others the subsequent fasti, or history of the Romans. He was the first who compiled a history of his country from the records of the pontiffs, and from popular tradition. He is spoken of with praise by Livy, who evidently borrowed largely from him, and by Cicero, Pliny, Appian, and others. Polybius however censures his obvious partiality for the Romans, and his unfairness towards the Carthaginians, in his account of the second Punic war. His Annals are lost, with the exception of some fragments, which have been preserved by subsequent writers, and are printed in the collections of Antonius Augustinus, Antwerp, 1595, Antonius Riccobonus, Venice, 1568, and others. The well-known impostor, Annio da Viterbo, published a small work on the origin of Rome, under the name of Fabius Pictor, but the fraud was discovered. Quintus Fabius Pictor was sent by the senate to Delphi after the battle of Cannæ, to consult the Oracle about the ultimate result of the war. He must not be confounded with Servius Fabius Pictor, who lived in the time of Cato the Elder, and who is praised by Cicero for his knowledge of jurisprudence, literature, and antiquity. (Vossius, *De Historicis Latinis*; Fabricius, *Bibliotheca Latina*.)

FABLE, Fábula in Latin, in its general sense means a fictitious narrative, but it also means more particularly a species of didactic composition, consisting of a short fictitious tale inculcating a moral truth or precept. As such it is divided into two sorts, the parable and the apologue. The former narrates some incident, which, although it may not have happened exactly as the narrator supposes, yet could have happened at any time, there being nothing impossible or improbable in it. Of this description are many of the parables contained in the Scriptures, and especially in the New Testament, it being a favourite mode with our Saviour of illustrating his precepts by similitudes. When, for instance, he spoke of the master who, before setting out on a long journey, intrusted certain talents or sums of money to each of his three servants, he did not mean that such a fact had occurred at any particular time, though it might have occurred, but he chose this figure as presenting the ways of God with regard to the mental or spiritual talents he has gifted men with, and which he expects them to cultivate and render useful in proportion to their capacities. The second species of moral fable, called apologue, relates facts which are evidently untrue, and cannot have happened; such as animals, or even inanimate things, speaking, but which serve as comparisons for the actions of men. Such was the well-known apologue of Menenius Agrippa, addressed to the plebs of Rome, who had revolted against the patricians, in which he told them of the various limbs of the human body having once revolted against the belly. (Livy, ii. 32.) Most of the fables which are called Æsopian are apologues, although some are of the parable kind; for example, that of Æsop and the villain who threw a stone at him. (Phædrus, iii. 5.)

The apologue is one of the oldest forms of composition, being well calculated to strike the minds of men in a rude state. Homer's War of the Mice and the Frogs is a composition of the nature of the apologue; only being extended to a considerable length, and including a succession of incidents, it is classed among the heroico-comic poems, whilst the apologue, or fable properly so called, points out only one particular incident from which it draws a moral. In the same manner, in modern times, the 'Animali Parlanti,' or 'Court and Parliament of Beasts' of Casti must be classed among the mock epic poems, although it may be said to consist of a series of apologues, each pointing to some particular error, or abuse, in the state of society, and in the conduct of men. It is probable that the older and simpler mythological fables of the gods and heroes among the antients were originally intended by the early patriarchs or priests to illustrate by allegory the attributes of the Creator, the phenomena of nature, and the progress of social life; but that in course of time people lost sight of the moral, and believed the fiction in its literal sense.

The oldest collection of fables in any European language is in Greek prose: the fables are attributed to Æsop, but much doubt exists as to the real author or authors of them. [ÆSOP.] Babrias wrote a metrical version of Æsopian fables, only a few of which have come down to us. [BABRIAS.] The fables called the fables of Bidpai [BIDPAI] are derived from a collection in the Sanscrit language, and Lokman is said to have written fables in Arabic; but several of the fables attributed to the latter appear to be the same as some of those attributed to Æsop, and it has been supposed that Lokman and Æsop were one and the same personage. [LOKMAN.]

Among the Latins, Phædrus, who lived under Tiberius, is the most celebrated: he professes to have taken his subjects from Æsop. The MS. of Phædrus was not discovered before the end of the sixteenth century. Avianus, or Avienus, who (supposing the two names to mean the same individual) lived under the elder Theodosius, wrote a collection of fables in Latin verse. (*Edition of Avienus*, Leyden, 1731, with a *Dissertation on the Identity of Avianus and Avienus*.) Faerno of Cremona, who lived about the middle of the sixteenth century, made a collection of Æsopian fables, which he turned into Latin verse, and which were published at Rome after his death in 1564. He was accused of plagiarism, as having found a MS. of Phædrus in some library, and borrowed his subjects from it.

In the modern languages, among the original writers of fables or apologues, La Fontaine has been generally considered as rivalling or surpassing Phædrus in this kind of composition; and indeed he may be fairly placed above all writers of this class. Among the English, Gay and Moore have written fables. The Germans have had Lessing, Gellert, and others; and the Spaniards have Yriarte and Samaniego. Among the Italians, Firenzuola, Crudeli, Baldi, Capaccio, in the sixteenth and seventeenth centuries, wrote chiefly translations or paraphrases from the Greek and Latin fabulists. In the eighteenth century Pignotti, a native of Tuscany, wrote original fables in verse, which were published at Pisa in 1782, and have been often reprinted since. Bertola also wrote fables (Pavia, 1788), with an essay on fables. Luigi Fiacchi published, under the name of 'Clasio,' a collection of fables (Florence, 1807).

FABRETTI, RAFFAELE, born at Urbino in 1619, was secretary of Pope Alexander VIII., and præfect of the papal archives in the castle St. Angelo under Innocent XII. Fabretti spent most of his time in searching the ruins which are scattered about Rome and its neighbourhood, and digging for those which were under ground. He explored catacombs, columbaria, sepulchres, and other subterraneous receptacles; and he gathered an abundant harvest of antiquities, and chiefly of inscriptions, which he ranged in a collection at his house at Urbino, which collection has been since transferred to the ducal palace of the same town. It is related that the horse upon which he rode for many years in his perambulations through the Campagna, and which his friends had nicknamed Marco Polo, became so accustomed to his master's hunting after inscriptions that he used to stop of himself whenever he met with any. Fabretti wrote, 1°, 'Inscriptionum Antiquarum Explicatio,' fol., 1699; 2°, 'De Columnâ Trajani,' fol., 1683, an elaborate work, in which he illustrated with much erudition and judgment the sculptures of that celebrated monument. He added to it an explanation of the Iliac table which is in the Capitoline Museum. 3°, 'De Aquis et Aquæductibus Veteris Romæ,' 4to., 1680, reprinted with notes and additions in 1788. Fabretti rendered great services to archæology by his system of illustrating one monument by the help of another. He had a controversy with James Gronovius about the interpretation of some passages of classical writers, in which both resorted to discreditable scurrilities. Fabretti died at Rome in January, 1700, at the age of eighty. He may be considered as the predecessor of Bianchini, Bottari, and other archæologists who illustrated the antiquities of Rome during the eighteenth century.

FABRIA'NO. [MACERATA.]

FABRI'CIUS, CAIUS, surnamed Luscinus, was consul for the first time in the year 471 of Rome, 283 B.C., when he triumphed over the Boii and the Etruscans. After the defeat of the Romans under the consul Lævinus by Pyrrhus (B.C. 281), Fabricius was sent by the senate as legate to the king to treat for the ransom of the prisoners, or, according to others, to propose terms of peace. Pyrrhus is said to have endeavoured to bribe him by large offers, which Fabricius, poor as he was, rejected with scorn, to the great admiration of the king. Fabricius being again consul (B.C. 279) was sent against Pyrrhus, who was then encamped near Tarentum. The physician to the king is said to have come secretly to the Roman camp, and to have proposed to Fabricius to poison his master for a bribe, at which the consul, indignant, had him put in fetters and sent back to Pyrrhus, upon whom this instance of Roman integrity made a great impression. Pyrrhus soon after sailed for Sicily, where he was called by the Syracusans, then hard pressed by the Carthaginians. Fabricius having defeated the Samnites, Lucanians, and Bruttii, who had joined Pyrrhus against Rome, triumphed over those people. Pyrrhus, afterwards returning to Italy, was finally defeated and driven away by M. Curius Dentatus (B.C. 276). Two years after, Fabricius being consul for the third time, with Claudius Cinna for his colleague, legates came from king Ptolemy of Egypt to contract an alliance with Rome. Several instances are related of the extreme frugality and simplicity of the manners of Fabricius, which are conformable to what is recorded of the austerity of Roman life previous to the Punic wars. When censor, he dismissed from the senate P. Cornelius Rufinus because he had in his possession ten pounds' weight of silver plate. Fabricius died poor, and the senate was obliged to make provision for his daughters. (Plutarch, *Life of Pyrrhus;* Livy, *Epitome* xiii., xiv., Eutropius; Justinus.)

FABRI'CIUS, JOANNES ALBERTUS, born at Leipzig in 1667, early distinguished himself by his proficiency in classical literature, and his penetration and judgment, assisted by an excellent memory. Having finished his studies at Leipzig, he went to Hamburg, where I. F. Meyer appointed him his librarian. He was afterwards appointed professor in the college of Hamburg, where he remained to the end of his life, having refused several advantageous offers made to him by the landgrave of Hesse Cassel and others. He was the author of many elaborate works, the principal of which are:—I. 'Bibliotheca Græca,' 14 vols. 4to., Hamburg, 1705-28. A new edition, with considerable improvements, was published by Harles, Hamburg, 1790-1809. The 'Bibliotheca Græca' is a most valuable work; it contains notices of all the Greek authors, from the oldest known down to those who flourished in the last period of the Byzantine empire, with lists of their works and remarks on them. II. 'Bibliotheca Latina,' 3 vols. 4to., 1708-21. Ernesti published a new and much improved edition of the same at Leipzig, 1773. The 'Bibliotheca Latina' is inferior in research and copiousness to the 'Bibliotheca Græca,' but is still a useful work, especially in the new form given to it by Ernesti. III. 'Bibliotheca Latina Ecclesiastica,' fol., Hamburg, 1718. IV. 'Bibliotheca Latina mediæ et infimæ Ætatis, cum Supplemento C. Schoettgenii, ex recensione Dominici Mansi,' Padua, 6 vols. 4to., 1754. V. 'Memoriæ Hamburgenses, 7 vols. 8vo.; to which Reimar, the son-in-law of Fabricius, added an eighth volume in 1745. VI. 'Codex Apocryphus Novi Testamenti,' 2 vols. 8vo., 1719; being a Collection of the false Gospels, Acts of the Apostles, and other apocryphal books which appeared in the early ages of Christianity. VII. 'Bibliographia Antiquaria,' 4to., 1760; being notices of the authors who have written upon Hebrew, Greek, Roman, and ecclesiastical antiquities. VIII. 'Delectus Argumentorum et Syllabus Scriptorum qui veritatem Religionis Christianæ lucubrationibus suis asseruerunt,' 4to., 1725. IX. 'Hydrotheologia,' written in German, and translated into French under the title 'Théologie de l'Eau, ou Essai sur la Bonté, la Sagesse, et la Puissance de Dieu, manifestées dans la Création de l'Eau,' 8vo., La Haye, 1741. X. 'Codex pseudepigraphus Veteris Testamenti,' being a counterpart of his work on the Apocrypha of the New Testament. XI. 'Conspectus Thesauri Litterarii Italiæ,' 8vo., 1749, or notices of the principal collections of the Historians of Italy, as well as of other writers who have illustrated the antiquities, geography, &c., of that country, including the great works of Burmannus and Grævius, with an account of the Italian literary journals existing or which had existed before the time of Fabricius, of the Italian academies, and a catalogue of Italian bibliographers and biographers classed according to the particular towns which they have illustrated. XII. 'Imp. Cæs. Augusti Temporum Notatio, Genus et Scriptorum Fragmenta,' with 'Nicolai Damasceni De Institutione Augusti,' 4to., 1727. XIII. 'Salutaris Lux Evangelii, sive Notitia Propagatorum per Orbem totum Sacrorum: accedunt Epistolæ quædam ineditæ Juliani Imperatoris, Gregorii Habessini Theologia Æthiopica, necnon Index geographicus Episcopatuum Orbis Christiani,' 4to., 1731; a work which contains useful information for students of ecclesiastical history. XIV. 'Centifolium Lutheranum, sive Notitia Literaria Scriptorum omnis generis de Martino Luthero, ejus Vita, Scriptis, et Reformatione Ecclesiæ editorum,' two vols. 8vo. 1730. XV. 'Centuria Fabriciorum Scriptis clarorum qui jam diem suam obierunt collecta,' 8vo., 1709, with a continuation in 1727. The author has included in his list not only the authors whose name or sirname was Fabricius, but also those whose names may be turned into the Latin Fabricius; such as Le Fevre, Fabri, the German Schmidts, &c. Independently of the above and other minor works, Fabricius published editions of Sextus Empiricus, of the Gallia Orientalis of Father Colomiès, of the works of St. Hippolytus, and many others. The catalogue of the works published by him exceeds 100. Fabricius died at Hamburg in April, 1736, in his 69th year. His private character was as praiseworthy as his learning was great. He was modest, hospitable to strangers who came to visit him, indefatigable in the duties of his professorship and rectorship, and yet he found time for the compilation of the numerous works already mentioned. Reimar, his son-in-law, wrote his biography in Latin, 8vo. 1732.

FABRI'CIUS, JOHANN CHRIST, was born in the year 1742, at Tundern, in the duchy of Sleswick. He was brought up to the medical profession, and at the age of twenty-three was made professor of natural history and rural economy at Kiel.

Fabricius studied under Linnæus, and afterwards enjoyed perhaps a more brilliant reputation than any other pupil of that great naturalist. Having been filled with emulation by the circumstance of Linnæus quoting him in his 'Systema Naturæ,' he resolved to make an especial study of entomology, a science at that time in its infancy. The first results of his investigations were shortly after (1775) made known in his 'Systema Entomologiæ,' where he proposed a new arrangement of the insect tribe, the novelty of which consisted in choosing for his divisions the modifications observable in the parts of the mouth. The two methods previously adopted were founded, the one upon the metamorphoses of the various tribes, the other upon their organs of motion. The latter was first pointed out by Aristotle, and was that adopted by Linnæus.

Fabricius subsequently published numerous other works of still greater importance, a list of which is given at the end of this article. Possessing a great knowledge of languages, Fabricius travelled through the northern and middle states of Europe, collecting new materials, and frequenting the various museums, from which he described all such insects as had hitherto been unpublished. Accounts of his travels in Norway, Russia, and England, were published by him. He visited England seven times, and received great assistance from inspecting the collections of Sir Joseph Banks*, John Hunter, Drury, Francillon, and others.

Far from being jealous of those naturalists who, in his day, enjoyed reputation in the same branches which he more particularly attended to, Fabricius, upon seeing the beautiful work of Walckenaer on spiders, expressed great delight; and although no request had been made, he hastened to convey to that author all the specimens which he possessed of the spider tribe. Fabricius was of an amiable disposition; and is said to have been reproached by a fellow professor for his extreme modesty, which his friend urged would retard his advancement. Although so well versed in entomology, Fabricius was not a stranger to other branches of zoology; he was also versed in botany and mineralogy. He died of dropsy, in his sixty-fifth year,

* Numerous insects in the collection of Sir Joseph Banks (which is now the property of the Linnæan Society) still have names attached to them in the handwriting of Fabricius.

much regretted by all naturalists. His principal works are as follows:—

1, 'Systema Entomologiæ, sistens Insectorum Classes,' &c., 1 vol., 8vo., Flensburgi et Lipsiæ, 1775; 2, 'Philosophia Entomologica,' 8vo., Hamburgi et Kilonii, 1778; 3, 'Reise nach Norwegen, mit Bemerkungen aus der Natur Historie und Œconomie,' 8vo., Hamburg, 1779; 4, 'Species Insectorum, sistens eorum differentias specificas, synonymia auctorum, loca natalia, metamorphosis,' &c., 2 vols., 8vo., Hamburg et Kilonii, 1781; 5, 'Mantissa Insectorum; sistens species nuper detectas,' &c., 2 vols., 8vo., Hafniæ, 1787; 6, 'Genera Insectorum,' 1 vol., 8vo. (Chilonii), Kiel, 1776; 7, 'Entomologia Systematica, emendata et aucta,' 4 vols., 8vo., Hafniæ, 1792, 93, 94; 8, 'Index Alphabeticus,' 1796; 9, 'Supplementum Entomologiæ Systematicæ,' 1 vol., 8vo., Hafniæ, 1798; 10, 'Systema *Eleuteratorum*,' 2 vols., 8vo., Kiliæ, 1801; 11, 'Index,' 8vo., Kiliæ, 1802; 12, 'Systema *Rhyngotorum*,' 8vo., Brunsvigæ, 1801; 13, 'Index Alphabeticus Rhyngotorum, genera et species continens,' 4to., Brunswick, 1803; 14, 'Systema *Piezatorum*,' 8vo., Brunsvigæ, 1804; 15, 'Systema *Antliatorum*,' 8vo., Brunsvigæ, 1805.

FABRI'ZIO, GERO'NIMO, commonly called **FABRICIUS AB AQUAPENDENTE**, was born in 1537 at Acquapendente in Italy, a city near Orvieto, in the States of the Church. His parents, although poor, contrived to furnish him with the means of obtaining an excellent education at Padua, which was then rapidly approaching the eminence it long held, especially as a school of medicine, among the universities of Europe. It appears to have been a favourite object with the Venetian government to encourage the study of the medical sciences. Vesalius and Fallopius had been successively invited to fill the chair of anatomy and surgery, then conjoined, and reaped a rich harvest of public emolument and honour; and Fabricius himself, who did much to extend the reputation of the school formed by these leaders in the restoration of anatomy, was afterwards still more munificently rewarded, though equal to neither in merit or posthumous fame. He became a pupil of Fallopius at an early age, and speedily attracted the attention and good-will of his instructor. He thus secured many peculiar advantages, of which he availed himself so well, that having taken his degrees in medicine with much credit, he was appointed on the death of Fallopius in 1562 to succeed him in the direction of the anatomical studies of the university, and three years later to the full emoluments of the professorship. The growing perception of the importance of anatomical knowledge led, in 1584, to the institution of a separate chair for the teaching of that branch of medicine, which, however, Fabricius appears to have still held in conjunction with that of surgery up to a late period of his life, with the able assistance of Casserius.

His reputation as a teacher drew students from all parts of Europe; till at length the theatre of anatomy, built originally by himself, became so crowded, that the Venetian senate provided him, in 1593, with another of ample dimensions at the public expense; and at the same time added largely to his salary, and granted him many exclusive privileges and titles of honour. The fame and wealth he derived from his practice as a surgeon was even more than equal to that which he enjoyed as an anatomist; and after upwards of fifty years of uninterrupted and well-deserved prosperity, he retired from public life the possessor of an enormous fortune and the object of universal esteem. Yet he does not appear to have found the contentment he sought in his retirement. His latter years were embittered by domestic dissensions and the unfeeling conduct of those who expected to become his heirs; and he died in 1619, at the age of eighty-two, not without the suspicion of poison, at his country-seat on the banks of the Brenta, still known as the Montagnuola d'Acquapendente.

The name of Fabricius is endeared to the cultivators of his science by the circumstance of his having been the tutor of William Harvey, whose discovery of the circulation of the blood (by far the most important yet achieved in physiology) was suggested, according to his own statement, by the remarks of Fabricius on the valvular structure of the veins. The title of Fabricius to the minor discovery has been disputed, though strongly asserted by some anatomists. The truth is, that his merit did not so much consist in original discovery as in the systematic arrangement and dissemination of the knowledge acquired by his predecessors. We have mentioned that he had more contemporary reputation as a practical surgeon than as an anatomist; and it is as a surgeon that he is still chiefly remembered. The observations recorded in his works having, however, been since wrought up in the general body of surgical knowledge, are now seldom consulted or quoted specifically as derived from himself.

He published many tracts on both departments. Those on anatomy and physiology, often referred to, but not with unmixed praise, by Harvey and the writers of the period immediately subsequent to his own, were collected in one volume folio, and republished, with a biographical memoir of the author, by Albinus at Leyden in 1738. The best edition of his surgical works, the twenty-fifth, was printed, also in one folio volume, at Padua in 1666. His writings are all in Latin, and display a considerable knowledge of the literature, general and medical, of that language and of the Greek.

FABYAN, ROBERT, the historian, was descended of a respectable family of Essex. Bishop Tanner says he was born in London. We have no dates of his early life, but he is known to have belonged, as a citizen, to the Company of Drapers. From records in the city archives, it appears that he was alderman of the ward of Farringdon Without, and in 1493 served the office of sheriff. In 1496, in the mayoralty of Sir Henry Colet, we find him 'assigned and chosen,' with Mr. Recorder and certain commoners, to ride to the king 'for redress of the new impositions raised and levied upon English cloths in the archduke's land,' (that is, the Low Countries) an exaction which was desisted from in the following year. In 1502, on the plea of poverty, he resigned the alderman's gown, not willing to take the mayoralty, and probably retired to the mansion in Essex, mentioned in his will, at Theydon Gernon. That he was opulent at this period cannot be doubted, but he seems to have considered that the expenses of the chief magistracy, even at that time, were too great to be sustained by a man who had a numerous family. He ordered the figures, as may be seen in his will, of sixteen children, in brass, to be placed upon his monument. Stowe, in his 'Survey of London' (edit. 1603, p. 198), gives the English part of the epitaph on Fabyan's tomb, from the church of St. Michael Cornhill, and says he died in 1511, adding that his monument was gone. Bale, who places Fabyan's death on February 28th, 1512, is probably nearest to the truth, as his will, though dated July 11, 1511, was not proved till July 12, 1513. Fabyan's will, printed with the last edition of his 'Chronicle,' affords a curious comment on the manners of the time of Henry VIII.

There have been printed five editions of Fabyan's 'Chronicle.' The first was printed by Pynson in 1516, and is of great rarity, in a perfect state. Bale says that Wolsey ordered many copies of it ('exemplaria nonnulla') to be burnt. The second was printed by Rastell in 1533. The third in 1542, by Reynes. The fourth in 1559, by Kyngeston. The changes of religion gave rise to many alterations and omissions in the third and fourth editions; but all the editions, as well as a manuscript of the second part of the book, were collated by Sir H. Ellis for the fifth edition, 4to., London, 1811, from the preface to which the present account of the historian has been principally taken. Fabyan, whose object it was to reconcile the discordant testimonies of historians, named his book 'The Concordance of Histories,' adding the fruits of personal observation in the latter part of his Chronicle. The first edition had no regular title; the latest is called 'The New Chronicles of England and France, in two parts, by Robert Fabyan, named by himself the Concordance of Histories.' The first edition, which may be considered as Fabyan's genuine work, extends from the time when 'Brute entryd firste the Ile of Albion,' to 1485; the second continued the history to 1509; the third to 1541; and the fourth to the month of May, 1559. The names of the several authors who were the continuators are unknown.

FAÇADE, a French term of modern introduction into the English language. It expresses the face, or front view of an edifice, and is often used in speaking of architectural buildings, as the façade of the Louvre, or the façade of St. Peter's at Rome. Façade was applied originally to denote the principal front of a building: the term Facciata, used by the Italians, is, for the most part, applied to such fronts as have a principal entrance.

FACCIOLA'TI, JA'COPO, was born at Toriggia on the

Euganean hills, in the province of Padua, in 1682. He studied first in the college of Este, and was afterwards placed by Cardinal Barbarigo, bishop of Padua, in the clerical seminary of that city, where he completed his studies and was admitted into holy orders. He was then appointed teacher and afterwards præfect or chief superior of the same establishment. The seminary of Padua had and still has a high reputation as a place for the study of Latin and for the numerous and generally accurate editions of the classics and other school books which have come from its press. Facciolati contributed to support this reputation by his labours. Among other works, he published improved editions of the Lexicon of Schrevelius, of the Thesaurus Ciceronianus of Nizolius, and of the vocabulary of seven languages known by the name of 'Calepino,' 2 vols. fol., 1731. In this last undertaking he was greatly assisted by his pupil, Egidio Forcellini, although he was not willing to acknowledge the obligation. The work however being still incomplete, J. B. Gallizioli made a new edition of the 'Calepino,' 2 vols. fol., Venice, 1778, and added many oriental and other words. It was in the course of his joint labours with Facciolati that Forcellini conceived the plan of a totally new Latin Dictionary, which, after more than 30 years' assiduous application, he brought to light under the title of 'Totius Latinitatis Lexicon,' 4 vols. fol., Padua, 1771. This work has superseded all other Latin Dictionaries. Forcellini, more generous than Facciolati, acknowledged in the title-page of his work that its production was in great measure due to the advice and instruction of his deceased master. In the introductory address to the pupils of the seminary of Padua, he tells them with a touching simplicity that when he undertook his work he was in the prime of youth, but that in the course of its compilation he had grown old and infirm as they then beheld him. The MS. of his 'Lexicon,' in 12 vols. fol., is preserved in the library of the seminary. A new edition of Forcellini's Lexicon has been lately published by the Abate Furlanetto of the same institution.

In 1722, Facciolati being appointed professor of logic in the university of Padua, delivered a series of introductory Latin discourses to the students of his class, which were received with considerable applause. In 1739 he began to write in Latin the 'Fasti of the University of Padua:' the introductory part, in which he describes the origin, the laws and regulations, and the object of that celebrated institution, is very well written, but the Fasti themselves contain little more than dry lists of the successive professors with few and unimportant remarks. His Latin epistles, as well as his Orations or discourses, have been admired for the purity of their diction. Indeed Facciolati's latinity was much praised by competent judges, such as Roberti and others of his countrymen, as well as by Brucker, the historian of philosophy, and other learned foreigners. The king of Portugal sent him a flattering invitation to Lisbon to take the direction of the public studies in his kingdom, but Facciolati declined the offer on account of his advanced age. He however wrote instructions for the re-organization of the scholastic establishments of that country, which had become necessary after the expulsion of the Jesuits. Facciolati died at Padua in 1769, in his 88th year. He left numerous works, mostly in Latin, besides those already mentioned; among others, some allegorical and satirical dialogues on the occasion of a funeral oration which he had written for the late Doge Pisani, being suppressed by the Padua Riformatori, or Censors.

FACIA. [CIVIL ARCHITECTURE; COLUMN.]

FACTOR, a name given to any algebraical expression considered as part of a product. Thus, a and $a+x$ are the factors of the product $a(a+x)$, or a^2+ax.

The term *factorial expression* has been in some instances applied to an expression of which the factors are in arithmetical progression; such as—

$$(x+1)(x+2)(x+3)(x+4).$$

See Herschel, *Examples of the Calculus of Finite Differences.*

FACTOR is a mercantile agent, who buys and sells the goods of others, and transacts their ordinary business on commission. He is entrusted with the possession, management, and disposal of the goods, and buys and sells in his own name, in which particulars consists the main difference between factors and brokers. [BROKER.]

The chief part of the foreign trade of every country is carried on through the medium of factors, who generally reside in a foreign country, or in a mercantile town at a distance from the merchants or manufacturers who employ them; and they differ from mere agents in being entrusted with a general authority to transact the affairs of their employers. The common duty of a factor is to receive consignments of goods and make sales and remittances either in money, bills, or purchased goods in return; and he is paid by means of a per-centage or commission upon the money passing through his hands. It is usual for a factor to make advances upon the goods consigned to him, for which, and also for his commission, he has a general lien upon all the property of his employer which may at any time be in his hands.

It is the duty of a factor to keep the goods with which he is entrusted free from injury, to keep a clear account of his dealings in the affairs of his employer, and at proper times to transmit it to him, together with information of all the transactions and liabilities which he has entered into and incurred in the course of his employment, and by which his principal can be affected; also to send him advice of all bills accepted or drawn upon his credit, and generally to act with fidelity to him, strictly observing the letter or the spirit of his instructions, and where they are silent, following the ordinary prudent course of other merchants dealing in like commodities as to time and mode of sale, credit, &c. A factor is not answerable against all events for the safety of the goods in his care: it is sufficient if he does all that a man of average prudence would do in the care of his own goods. He is not answerable in cases of robbery, fire, or other accidental damage happening without his default He is bound, upon receiving notice from his principal, to insure the goods consigned to him (provided he has effects of his principal in his hands of sufficient amount to defray the premium), to discharge the duties payable upon the exportation or importation of the goods, or to cause the regular and necessary entries to be made at the custom-house, and do all other things necessary for the safety and preservation of the goods. His liability in this respect is ably explained by Sir William Jones in his *Treatise on Bailments;* and see BAILMENTS, fifth division, 'Locatum,' second subdivision.

Where general and unlimited orders are given to a factor, he is left to buy and sell on the best conditions he can, and if detriment arise to the principal, he has no redress, unless he can show that the factor acted fraudulently or with gross negligence.

In accordance with the general rule that a principal can only be bound by the acts of his agent while acting within the scope of his authority, it was held, previously to the passing of the recent stat. 6 George IV., c. 94, that a factor had only authority to sell the goods of his principal, and that if he pledged them, the principal might recover them from the pledgee. This was productive of considerable hardship in many cases; for, besides that by the mercantile law of every other country except England and America, the pledgee might retain the goods as security for his advances to the factor, it was urged, and with great reason, that, as between the principal and the pledgee of the factor, the principal ought to bear the loss. He it was who placed confidence in the factor, and who enabled him to appear the actual owner of the goods: he might have controlled the authority and limited the operations of his factor; but the pledgee knew nothing of his employment; he saw only the factor in the possession of the goods, and advanced his money on what appeared a sufficient security for repayment. In accordance with views like these, that statute was passed, and now the pledgee of a factor, when he lends his money without notice that the factor is not the actual owner of the goods. is enabled to retain them for his security; and even when he has such notice, the lender has a lien upon the goods to the same amount as the factor was entitled to.

A sale by a factor creates a contract between the principal and the buyer, and the principal may maintain an action against the buyer for the price, and may by notice direct him not to pay the money to the factor, which notice the buyer is bound to attend to. So a purchase by a factor for his principal renders the latter liable to the vendor, though a payment to the factor is a sufficient discharge, unless notice to the contrary has been given by the principal. And this holds good in both cases, even when the

name of the principal is not disclosed at the time of the contract, but is afterwards discovered; though, where a factor conceals the name of his principal and buys or sells apparently on his own account, the buyer or seller may treat the factor as the principal so far as any other liability of the factor may exist to him; as where a factor sells goods in his own name, being indebted to the purchaser, the latter may set off the amount of debt due to him from the factor against the price of the goods.

There is another description of factor, who acts under what is called a del credere commission, where, for an additional per-centage he engages for the solvency of the purchasers of the goods consigned to him. This contract, it is evident, arises on the supposition that the factor being resident among the purchasers, must be better able to judge of their solvency than the principal, residing in a foreign country. For a long time it was considered that under this arrangement those who dealt with the factor were liable to him alone, and that he was liable, in the first instance, to his employer; it has, however, been decided that the factor stands in the relation of a surety for the persons with whom he deals on account of the employer, and that he is liable to his employer only in case of their default. Del credere is an Italian mercantile phrase, of the same signification as the English word guarantee, and the Scotch warrandice.

When goods are consigned to joint factors they are answerable for one another for the whole, and by the law of merchants, as factors, are oftentimes dispersed, one may account without his companion.

The principal may recover against his factor by action for the neglect of his duty, or disobedience to his instructions if loss occur thereby, as if he purchases goods at a limited price, and fraudulently sells them again for his own profit. If a factor, without the orders of his principal, exports goods prohibited by the Customs' laws, and the same are seized, the loss is the factor's; and so, if he pay money without the direction of his employer, or sells his goods at an undervalue, or exports goods of an improper quality, he is answerable for the damage. And if a factor exports goods of a different quality or kind from those he was directed to purchase, or sends them to a place other than that to which he was ordered to send them, the merchant may refuse to accept them, and may recover any damage he has sustained, in consequence of his neglect, from the factor. The rights and liabilities of merchants and factors are governed by the laws of the place in which they are domiciled, and any contract which may be made by either of them must be governed by the law of the place where it is made, and these rules are acted upon by the courts of justice of every civilized nation. Thus, since the passing of the above-mentioned statute, a foreign merchant cannot recover his goods from the pledgee of his factor in England, though he may be totally ignorant of the change which has taken place in the law. And again, if a bill be accepted in Leghorn by an Englishman, and the drawer fails, and the acceptor has not sufficient effects of the drawer in his hands at the time of acceptance, the acceptance becomes void by the law of Leghorn, and the acceptor is discharged from all liability, though by the law of England he would be bound. (See 2 Strange's *Reports*, 733; Beawe's *Lex Merc.*; Bell's *Commentaries*; Paley, *Principal and Agent*; M'Culloch's *Commercial Dict.*)

FACTORY. FACTORY SYSTEM. The name of factory was formerly given only to establishments of merchants and factors resident in foreign countries, who were governed by certain regulations adopted for their mutual support and assistance against the undue encroachments or interference of the governments of the countries in which they resided. In modern times these factories have, in a great measure, ceased to exist, because of the greater degree of security which merchants feel as regards both the justice of those governments and the protection, when needed, of their own country. In its usual acceptation, the word factory is now employed to denote an establishment in which a considerable number of workmen or artizans are employed together for the production of some article of manufacture, most commonly with the assistance of machinery. The factory-system of England owes its origin to the invention and skill of Arkwright. It is true the name of factory is equally applied to various establishments for the operations of which those inventions are inapplicable, but it is probable that but for the invention of spinning-machinery, and the consequent necessary aggregation of large numbers of workmen in cotton-mills, the name would never have been thus applied. It is in these cotton-mills that the factory system has been brought to its highest state of perfection, and it cannot therefore be necessary to extend our description to the operations of any other branch of manufacture.

The first cotton-factory was established by Arkwright in connection with Messrs. Need and Strutt, of Derby, and was situated at Cromford, on the river Derwent. It was built in 1771, and continues still in operation, with the original spinning-frames of the great inventor. It is not the least among the merits of that extraordinary man, that being the first to employ the combined labour of numerous workmen for the production of that which had previously resulted from individual employment, he was able to arrange and establish the details of the processes with so great a regard to order, economy, and simplicity of action, that with but few and unimportant modifications, his plans are continued to the present day. [ARKWRIGHT.] The operations of Arkwright and his partners were for many years met by a spirit of opposition on the part of other manufacturers, who foresaw that the success of the new machinery would speedily destroy the value of the hand-spinning implements which they employed. Their combinations to destroy his patent rights have already been described. Taking advantage of the prejudices of the workmen, they had no difficulty in producing the belief that the new machines would soon entirely supersede manual labour, and the consequence of this delusion was a general crusade of the workmen against all spinning-machinery set in motion by horse or water-power. The principal effect of the riots thus occasioned was the removal of establishments to other and more peaceable parts of the country. For a considerable time Arkwright and his partners had an interest in the greater part of the cotton factories that were erected. The first of these establishments brought to use in Manchester was built in 1780, and had its machinery impelled by an hydraulic wheel, the water for which was furnished by a single-stroke atmospheric pumping steam-engine. The progress of these new establishments was so rapid that in 1787 there were 145 cotton-spinning factories in England and Wales, containing nearly two millions of spindles, and estimated to produce as much yarn as could have been spun by a million of persons using the old domestic wheel.

A return called for by the House of Commons in the last session states the number of factories which, in the month of February, 1837, were under the regulations imposed by the 'Factory Act.' From this return, it appears that the establishments at that time subject to the visits of the parliamentary inspectors amounted to 4160, showing an increase of 1000 factories upon the numbers given above. This great increase may be owing in part to the circumstance of some establishments existing in 1835 having since been brought under the regulations. The return does not apportion the different manufactures to which those 4160 establishments are applied. In a report made by Dr. Kay, one of the assistant Poor Law Commissioners, in July, 1835, it is stated that in the cotton manufacturing districts of Lancashire and their immediate vicinity steam power equivalent to 7507 horses was then either erected or in the course of being erected, but the establishments for the use of which that additional machinery was destined were not yet supplied with hands. At the ordinary ascertained rate this amount of mechanical power would call for the employment of 45,042 hands, exclusive of mechanics, labourers, handicraftsmen, and others employed out of the factories. The activity that up to the close of 1836 was experienced in this branch of national industry must have occasioned even a still greater extension than is mentioned by Dr. Kay, and we shall probably be within the mark if we estimate the number of hands employed in cotton factories in the autumn of 1836 at considerably more than 300,000. The check to commercial operations then experienced has probably prevented any fresh extension of the manufacture, but at this time (October, 1837) the cotton factories throughout the kingdom are in full operation in order to answer the demand for goods in almost every market in the civilized world.

The number of cotton, wool, silk, and flax-spinning factories worked by steam or water-power in the United Kingdom, with the number and ages of persons employed therein in the year 1835, was stated in the Statistical Tables published by the Board of Trade to be as follows:—

DIVISIONS OF THE KINGDOM.	Number of Factories.		NUMBER AND AGES OF PERSONS EMPLOYED.														
			Between 8 and 12 years.			Between 12 and 13 years.			Between 13 and 18 years.			Above 18 years.			Total Persons.		
	At Work.	Empty.	Males.	Fem.	Total.	Males.	Fem.	Total.	Males.	Fem.	Total.	Males.	Fem.	Total.	Males.	Fem.	Total.
COTTON.																	
England . . .	1,070	42	4,030	3,073	7,103	9,196	7,865	17,061	23,974	29,869	53,843	50,675	53,410	104,085	87,875	94,217	182,092
Wales	5	..	..	..	..	56	33	89	146	208	354	250	458	708	452	699	1,151
Scotland . . .	159	..	454	538	992	1,258	1,832	3,090	2,845	7,597	10,442	6,168	12,403	18,571	10,529	22,051	32,580
Ireland . . .	28	..	44	58	102	153	181	334	286	561	847	960	1,553	2,513	1,639	2,672	4,311
Total of Cotton Factories . .	1,262	42	4,528	3,669	8,197	10,663	9,911	20,574	27,251	38,235	65,486	58,053	67,824	125,877	100,495	119,639	220,134
WOOL.																	
England . . .	1,102	9	2,317	2,158	4,475	3,936	3,835	7,771	9,497	10,064	19,561	18,613	15,041	33,654	34,363	31,098	65,461
Wales	85	..	47	29	76	119	61	180	164	101	265	198	66	264	528	257	785
Scotland . . .	90	..	104	77	181	210	332	542	315	698	1,013	1,083	686	1,769	1,712	1,793	3,505
Ireland . . .	36	..	13	19	32	25	40	65	162	249	411	674	341	1,015	874	649	1,523
Total of Woollen Factories . .	1,313	9	2,481	2,283	4,764	4,290	4,268	8,558	10,138	11,112	21,250	20,568	16,134	36,702	37,477	33,797	71,274
SILK.																	
England . . .	231	25	2,458	3,871	6,329	938	1,674	2,612	2,596	6,546	9,142	4,009	7,855	11,864	10,001	19,946	29,947
Scotland . . .	6	..	28	52	80	14	37	51	40	244	284	103	168	271	185	501	686
Ireland . . .	1	..	..	2	2	..	..	..	..	25	25	2	20	22	2	47	49
Total of Silk Factories . .	238	25	2,486	3,925	6,411	952	1,711	2,663	2,636	6,815	9,451	4,114	8,043	12,157	10,188	20,494	30,682
FLAX.																	
England . . .	152	..	487	434	921	1,048	1,173	2,221	1,929	4,192	6,121	2,551	4,379	6,930	6,015	10,178	16,193
Scotland . . .	170	..	104	175	279	609	918	1,527	1,129	3,064	4,193	1,550	5,860	7,410	3,392	10,017	13,409
Ireland . . .	25	..	1	15	16	125	199	324	399	1,308	1,707	463	1,171	1,634	988	2,693	3,681
Total of Flax Factories . .	347	..	592	624	1,216	1,782	2,290	4,072	3,457	8,564	12,021	4,564	11,410	15,974	10,395	22,888	33,283
Total of the four branches of manufacture .	3,160	76	10,087	10,501	20,588	17,687	18,180	35,867	43,482	64,726	108,208	87,299	103,411	190,710	158,555	196,818	355,373

It will be seen from the foregoing table, that a very large proportion of the hands employed in factories consist of children and young persons. The large sums invested in machinery make it a matter of great importance to the owners to keep their works in motion as constantly as possible, and, unless prevented by legislative interference, there is too much reason to believe that children may be tasked beyond their strength, to the permanent injury of their constitutions. This abuse was the more to be apprehended, because a large proportion of the children engaged in cotton-spinning are not directly employed by the masters, but are under the control of the spinners, a highly-paid class of workmen, whose earnings depend greatly upon the length of time during which they can keep their young assistants at work. Although the recitals of cruelties alleged to exist were shown upon investigation to have been very greatly exaggerated, it cannot be denied that enough of misery was produced to render it imperative upon the legislature to interfere. A parliamentary committee sat for the investigation of this subject in 1832, and subsequently a commission was issued by the crown for ascertaining, by examinations at the factories themselves, the kind and degree of abuses that prevailed, and for suggesting the proper remedies. In consequence of these inquiries an act was passed in 1833, (2 and 3 Wm. IV., c. 103,) the provisions of which, it is generally believed, have effected all the good which it is in the power of the legislature to do, consistently with the prosecution of the branches of industry to which the provisions of the act apply: the principal of those provisions are as follows:—

After the 1st January, 1834, no person under the age of 18 years is allowed to work in any cotton, woollen, flax, or silk factory worked by the aid of steam or water-power, between the hours of half-past eight in the evening and half-past five in the morning.

No person under 18 years of age is allowed to work more than 12 hours in any one day, nor more than 69 hours in the week. In factories worked by the aid of water-power, time lost through the deficiency of water may be made up at the rate of three hours additional labour in the week. In factories where the steam-engine is employed, lost time occurring through any accident happening to the machinery may be made up at the rate of one hour per day. One hour and a half to be allowed in each day for meals.

Except in silk-mills, no children under nine years of age are allowed to be employed.

Children under 11 years old are not to be worked more than nine hours in any one day, nor more than 48 hours in one week. This clause came into operation six months after the passing of the act. At the expiration of another 12 months its restriction was applied to children under 12 years old, and when 30 months from the passing of the act had elapsed the restriction was applied to all children under 13 years old. As the act was passed on the 30th August, 1833, this clause came fully into operation on the 1st of March, 1836. In silk-mills, children under 13 years of age are allowed to work 10 hours per day. The children whose hours of work are regulated by the act are entitled as holidays to the whole day on Christmas-day and Good-Friday, and besides to eight half days in the year. It is made illegal for any mill-owner to have in his employ any child who has not completed 11 years of age without a certificate by a surgeon or physician, 'that such child is of the ordinary strength and appearance of children of or exceeding the age of nine years.' In 18 months from the passing of the act this provision was made to apply to all children under 12 years of age, and upon the first March, 1836, the provision was made to include all children under the age of 13. Four persons were appointed under the act to be Inspectors of Factories, in order to carry into effect the various provisions which it contains, with power to make such rules and orders for the purpose as they should see necessary; and in order to assist the inspectors in the performance of their duties, an adequate number of superintendents were appointed to act under their directions.

After the expiration of six months from the passing of the act, it was declared unlawful to employ in any factory any child under the ages restricted to forty-eight hours' labour in the week, unless on every Monday the employer should receive a ticket from some schoolmaster, certifying that such child has 'for two hours at least for six out of seven days of the week next preceding attended his school. The school to be chosen by the parents or guardians of the child; but in case of their omitting to appoint any school, or in case of the child being without parent or guardian, the inspector may appoint some school in which the child may be taught, and the employer may be allowed to deduct from its weekly earnings any sum not exceeding one penny in every shilling, to pay for the schooling of such child.'

The full and perfect carrying out of the intention of the legislature in passing this act is provided for as far as possible by various penalties, which it is not necessary further

to particularise. One half of the penalties are, as is usual, awarded to the informers, and the remainder is to be applied towards the support of schools in which children employed in factories are educated.

The faithful discharge of their duties on the part of the inspectors is provided for, by requiring them twice in every year, and oftener, if called upon, to deliver in a report to the secretary of state, detailing the condition of the factories, and of the children employed therein.

FACULTIES. [UNIVERSITY.]

FÆ'CULA. [STARCH.]

FAE'NZA (formerly Faventia), a town and bishop's see of the papal state north of the Apennines, in the delegazione or province of Ravenna. It is situated in a well-cultivated plain watered by the river Lamone, which rises in the Apennines of Tuscany and runs to the Adriatic. A naviglio or navigable canal communicates between Faenza and the Po di Primaro, or southernmost branch of the Po. Faenza is a well-built, modern-looking town, with about 15,000 inhabitants. The streets are regular; there is a fine market-place surrounded by arcades, many palaces, churches rich in paintings, convents, a fine bridge on the Lamone, a theatre, and a Lyceum. There are several manufactories of a kind of coloured and glazed earthenware, which is called Majolica in Italy, and Faience in France, where it was introduced from Faenza, and which, before the manufacture of china or porcelain became established in Europe, was in greater repute than it is at present. There are also manufactories for spinning and weaving silk, and some paper-mills. Faventia was antiently a town of the Boii, and afterwards a municipium under the Romans. It was near Faventia that Sulla defeated the consul Carbo and drove him out of Italy. (Livy, *Epitome*, 88.) It was afterwards ruined by the Goths, was restored under the Exarchs, but its walls were not raised until A.D. 1286. It was then for some time subject to the Bolognese, but was afterwards ruled by the house of Manfredi to the end of the fifteenth century. Galeotto Manfredi being murdered by his wife left two infant sons, Astorre and Evangelista, the elder of whom, a remarkably handsome youth, was proclaimed by the inhabitants lord of Faenza; but a few years after, Cesare Borgia, as captain-general of his father, Pope Alexander VI., besieged the town, and the inhabitants surrendered on condition that Astorre and his brother should be free. He however sent them prisoners to Rome, where they were cruelly put to death in the Castle Sant' Angelo, and their bodies thrown into the Tiber, in the year 1501. This was one of the most atrocious transactions in the life of Borgia. Since that time Faenza has been annexed to the papal state. Faenza lies on the Via Æmilia, 30 miles south-east of Bologna, 40 north-west of Rimini, and 20 south-west of Ravenna. In the Roman times, a road led from Faventia to the south, which ascending the valley of the Anemo, now Lamone, and crossing the ridge of the Apennines, descended to Fæsulæ. By this road some have supposed that Hannibal crossed the Apennines into Etruria. A new carriage-road in a parallel direction, but more to the eastward, has been completed by the present grand-duke of Tuscany: it leads from Dicomano, in the valley of the Sieve, north of Florence, crosses the Apennines of San Benedetto, 5000 feet above the sea, and then following the course of the river Montone, joins the Via Æmilia near Forli.

FA'GUS, the beech, is a genus of Corylaceous exogens, having triangular nuts enclosed within a spiny capsule or husk. There are several species, some of which are mere bushes; the only one known in Europe of any importance is the *Fagus sylvatica*, or common beech, a native of various parts of the world in temperate climates. In Europe it is found as far north as 58° in Norway: it is met with in Palestine and Armenia, all over the south of Europe, and in the United States of America. It is one of the most handsome of our trees on dry sandy or chalky situations; its mast or nuts not only furnish food for swine, but yield by pressure after pounding a useful oil; and its timber, although not of good quality where strength and durability are required, is very extensively used for a variety of purposes, particularly for boat-building, work under water, carving and chair-making; it is also one of the best kinds of wood for fuel. Several varieties are propagated by the nurserymen, the *purple* and the *fern-leaved* being beautiful, and the *crested* very much the contrary. (See Loudon's *Arboretum and Fruticetum Britannicum*, p. 1949, for a copious account of this tree.)

The common beech is multiplied by sowing its mast; the varieties by grafting upon the wild sort. To effect this successfully, it is necessary that the scions should be of at least two years' old wood, and the grafts must be clayed first and then earthed up. If one year old wood is used the scions rarely take.

There is no doubt that the beech is the plant called Fagus by Virgil; but the Fegus (φηγός) of Theophrastus seems to have been some sort of oak with sweet acorns, and is by most botanical commentators referred to the Quercus Esculus of Linnæus.

FAHLORE, *Fahlerz*, grey copper ore. Of this there are two varieties, the *arsenical* and the *antimonial;* the former occurs crystallized and massive; the primary form of the crystal is a cube, but the regular tetrahedron is the predominating crystal. Colour steel-grey. Opaque. Lustre metallic. Sp. gr. 4·8, 5·1. Hardness 3·0,4·0. Brittle. Cleavage parallel to the planes of the tetrahedron, very indistinct. Fracture conchoidal.

Massive Variety.—Amorphous. Structure, granular to compact.

It occurs in Cornwall, Hungary, Saxony, &c. A specimen from Freiberg, analyzed by Klaproth, yielded—

Arsenic	24·10
Copper	41·
Iron	22·50
Sulphur	10·
Silver	·40
Loss	2·
	100·

It frequently contains a much larger quantity of silver, and not uncommonly zinc.

Antimonical Fahlore.—Occurs crystallized in modified tetrahedrons. Colour dark lead-grey, approaching to iron black, both externally and internally; not very brittle.

Analysis of a specimen from Kapnic by Klaproth:—

Antimony	22·
Copper	37·75
Iron	3·25
Sulphur	28·
Silver and a trace of manganese	·25
Zinc	5·
Loss	3·75
	100·

FAHLUNITE, *Tricklasite*. Occurs crystallized and massive. Primary form of the crystal a right rhombic prism, but it usually occurs in imbedded, regular, hexagonal prisms. Colour yellowish, greenish, and blackish-brown. Nearly or quite opaque. Lustre resinous. Sp. gr. 2·66 Hardness 5·0, 5·5. Streak greyish-white. Cleavage perpendicular to the axis of the prism.

It is found at Fahlun, in Sweden.

Before the blow-pipe alone it becomes grey, and fuses on its thinnest edges; with borax it melts slowly into a coloured glass.

According to Hissinger it consists of—

Silica	46·74
Alumina	26·73
Magnesia	2·97
Oxide of iron	5·11
Oxide of manganese	0.43
Water	13·50
	95·48

FAHRENHEIT. [THERMOMETER.]

FAINTING. [SYNCOPE.]

FAIOUM, a province of Egypt to the west of the Libyan ridge which bounds the valley of the Nile on the west. About 12 miles north-west of Benisouef there is a depression in the ridge about six miles in length, which leads to the plain of the Faioum. This plain is of a circular form, about 40 miles from east to west and about 30 from north to south. The northern and north-western part of this plain is occupied by the lake called Birket el Keroun, which spreads in the form of a crescent about 30 miles in length and about five miles broad towards the middle. A range of naked rocks bounds the lake to the north and joins towards the east the Libyan ridge which skirts the valley of the Nile. To the west and south the plain is bounded by lower hills which

divide it from the Libyan desert. It forms in fact a basin with only one opening or outlet to the east towards the Nile. The Bahr Yussouf, or great canal, which runs parallel to the Nile and skirts the Libyan ridge, on arriving at the gap above mentioned, at a village called Howarah Illahoun, turns to the west, passing under a bridge of three arches through which the water flows and forms a fall of about three feet at low water. It then runs along the valley, and, on reaching the entrance of the Faïoum, at the village of Howarah el Soghair, a wide cut branches off from it to the right, running first north and then north-west, and passing by Tamieh meets the north-east extremity of the lake. About two miles below Howarah el Soghair another deep ravine opens to the south, and then turning south-west, passes by Nezleh, and enters the south-west part of the lake. Between these two branches the cultivated part of the Faïoum is contained. But these two cuts have been long dyked across at their beginning, in order to economize the water of the Nile, which, owing to the rising of the bed of the Bahr Yussouf, flows less copiously than formerly. Only a small part of the water finds its way to the lake by the Tamieh and Nezleh cuts. The main stream continues its course westwards towards the middle of the plain and the town of Medinet el Faïoum, the capital of the province. Here the water becomes distributed into a multitude of small canals for irrigation, which spread in every direction through the central part of the plain, and which are the cause of its extraordinary fertility, for the Bahr Yussouf contains water all the year round. But that fertility exists only within the range of the canals. All the part west of Nezleh is arid and sandy, and only inhabited by a few nomade Arabs, though it bears the traces of former cultivation. The strip of land which borders the lake Keroun is low and marshy, marking the original basin of the lake which is separated from the cultivated lands by a considerable rise all along, reckoned by Jomard to be about 20 feet above the level of the lake. The village of Senhour, which is now some miles distant from the lake, was, in 1673, when Vansleb visited it, close to the water. Jomard reckons that when the water covered the whole of the low land below the rise above mentioned, its circumference must have been above 100 miles. [BIRKET EL KEROUN.] It is calculated that the land susceptible of cultivation in the Faïoum is about 450 square miles, of which hardly one-half is now cultivated. The villages, which are said to have been at one time above 300, are now reduced to less than 70. Still the cultivated part is superior in fertility to every other province of Egypt, from which it differs in the greater variety of its products, and the better appearance of its villages. In addition to corn, cotton, and the other cultivated plants, it produces in abundance apricots, figs, grapes, and olives, and other fruit-trees, which thrive here better than in the valley of the Nile. This was also the case in antient times, for Strabo says that ‘ the Arsinoite nome (the antient name of the Faïoum) excelled all others in appearance and condition, and that it alone produced olive trees, which were not found, elsewhere in Egypt except in the gardens of Alexandria. A vast quantity of roses also grow in the Faïoum, and this district is celebrated for making rose-water, which is sold at Cairo and all over Egypt for the use of the wealthy.

The remains of antiquities in the Faïoum are few. Two pyramids of some baked bricks about 70 feet high stand at the entrance of the valley, one near Howarah Illahoun, and the other near Howarah el Soghaïr. There is an obelisk of red granite 43 feet high, with two sides narrower than the others and a circular top, sculptured with numerous hieroglyphics, near the village of Bijige, a few miles south of Medinet el Faïoum. In Burton's *Excerpta* there is a drawing of it. Pococke i., 59, also gives a description of it. It is said to be of the same age as that of Heliopolis, bearing the name of Osirtesen I. (See an account of this obelisk in the *Library of Entertaining Knowledge, British Museum, Egyptian Antiquities*, vol. i., pp. 318—21.) Near Medinet el Faïoum are some remains of the antient Arsinoe or Crocodilopolis, consisting of fragments of granite columns and statues, described by Belzoni. At Kasr Keroun, near the south-west extremity of the lake, is a temple 94 feet by 63 and about 40 feet high, which contains 14 chambers, and appears to be of the Roman period. On the north-west bank of the lake, at a place called Denay, a raised pavement or dromos, about 1300 feet in length, leads to a building, partly of stone and partly of brick, 109 feet by 67, divided into several apartments and surrounded by an outer wall of crude brick 370 feet by 270. This is supposed to be the site of the antient Dionysias. Further to the east, but on the same bank of the lake, at a place called Kom Waseem el Hogar, are the ruins of Bacchis. The direction of the principal streets and the plans of many of the houses may be distinctly traced. The site of the antient labyrinth has not yet been ascertained; Wilkinson thinks it was near Howarah el Soghaïr, at the entrance of the plain. At Fedmin el Kunoïs, or ‘ the place of churches’ in Coptic, near the south-east bank of the lake, are some remains of early Christian monuments: the village is now occupied one half by Copts and the other half by Mohammedans, who seem to live in harmony together.

The mountains along the north bank of the lake Keroun, on which the rains fall annually, are said to contain salt, and to this circumstance the saltness of the waters of the lake is attributed by some. As the lake now receives but little of the waters of the Nile, the bitterness of its waters must have increased. No fish is said to be found in it, and Belzoni, at the time of his visit, saw nothing upon it except a crazy kind of ferry-boat.

South of the Faïoum there is an opening through the ridge of low hills leading into a smaller circular plain or basin, with a small lake called Birket el Garaq, which has one or two hamlets on its banks. A small stream from the Bahr Yussouf runs into it. The road-track of the caravans to the smaller oasis passes through this place. (*Description of Egypt and Map* in the French work; Browne; Belzoni; and Wilkinson's *Topography of Thebes*.)

FAIR, an annual or fixed meeting of buyers and sellers; from the Latin *feria*, a holiday. Fairs in antient times were chiefly held on holidays.

Antiently before many flourishing towns were established, and the necessaries or ornaments of life, from the convenience of communication and the increase of provincial civility, could be procured in various places, goods and commodities of every kind were chiefly sold at fairs; to which as to one universal mart, the people resorted periodically, and supplied most of their wants for the ensuing year. The display of merchandise, and the conflux of customers at these principal and almost only emporia of domestic commerce, was prodigious; and they were therefore often held on open and extensive plains. Warton, in his ‘History of English Poetry,’ has given us a curious account of that of St. Giles's hill or down, near Winchester. It was instituted and given as a kind of revenue to the bishop of Winchester by William the Conqueror, who, by his charter, permitted it to continue for three days. But in consequence of new royal grants, Henry the Third prolonged its continuance to sixteen days. Its jurisdiction extended seven miles round, and comprehended even Southampton, then a capital trading town; and all merchants who sold wares within that circuit, unless at the fair, forfeited them to the bishop. Officers were placed at a considerable distance, at bridges, and other avenues of access to it, to exact toll of all merchandize passing that way. In the mean time, all shops in the city of Winchester were shut. In the fair was a court called the pavilion, at which the bishop's justiciaries and other officers assisted, with power to try causes of various sorts for seven miles round. Nor could any lord of a manor hold a court-baron within the said circuit without license from the pavilion. During this time the bishop was empowered to take toll of every load or parcel of goods passing through the gates of the city. On Saint Giles's eve, the mayor, bailiffs, and citizens of the city of Winchester delivered the keys of the four city gates to the bishop's officers; who, during the said sixteen days, appointed a mayor and bailiff of their own to govern the city, and also a coroner to act within it. Numerous foreign merchants frequented this fair; and it appears that the justiciaries of the pavilion and the treasurer of the bishop's palace of Wolvesey received annually for a fee, according to antient custom, four basons and ewers of those foreign merchants who sold brazen vessels in the fair, and were called *mercatores diaunteres*. In the fair several streets were formed, assigned to the sale of different commodities, and called the *Drapery*, the *Pottery*, the *Spicery*, &c. Many monasteries in and about Winchester had shops or houses in these streets used only at the fair, which they held under the bishop, and often let by lease for a term of years. As late as 1512, as we learn from the Northumberland Household-book, fairs still continued to be the principal marts for pur-

chasing necessaries in large quantities, which are now supplied by the numerous trading towns.

Philip, king of France, complained in very strong terms to Edward II. A.D. 1314, that the merchants of England had desisted from frequenting the fairs in his dominions with their wood and other goods, to the great loss of his subjects; and entreated him to persuade, and, if necessary, to compel them to frequent the fairs of France as formerly, promising them all possible security and encouragement. (See Rym. *Fœd.*, tom. iii., p. 482.)

When a town or village had been consumed, by way of assisting to re-establish it, a fair, among other privileges, was sometimes granted. This was the case at Burley, in Rutlandshire, 49th Edw. III. (*Abbrev. Rot. Orig.*, vol. ii., p. 338.)

The different abridgments of Stowe and Grafton's Chronicles, published by themselves in Queen Elizabeth's time, contain lists of the fairs of England according to the months. There is also 'An authentic Account published by the king's authority of all the Fairs in England and Wales, as they have been settled to be held since the alteration of the style; noting likewise the Commodities which each of the said Fairs is remarkable for furnishing;' by William Owen, 12mo. Lond. 1756.

No fair or market can be held but by a grant from the crown, or by prescription supposed to take its rise from some antient grant, of which no record can be found. (2 *Inst.* 220.)

(See Dugdale's *Hist. Warw.*, pp. 514, 515; Warton's *Hist. Engl. Poet.*, vol. i., p. 279; Henry, *Hist. Brit.*, 8vo. edit., vol. viii., p. 325; Brand's *Popular Antiq.*, 4to. edit., vol. ii., p. 215.)

The fairs of Frankfort on the Mayn and Leipzig are still pre-eminent in Europe; the former held at Easter and in the months of August and September; the latter at Easter, Michaelmas, and the New Year. Leipzig at these times is the mart and exchange of Central Europe, and is visited by merchants and foreigners, from the most distant parts of the globe, sometimes to the number of thirty or forty thousand. The whole book-trade of Germany is centred in the Easter fair at Leipzig.

FAIRFAX, EDWARD, was the second son of Sir Thomas Fairfax, of Denton in Yorkshire*. The date of his birth is unknown; but as his translation of Tasso's 'Jerusalem Delivered' was published in 1600, we may suppose that it fell some time in the reign of Queen Elizabeth.

Contrary to the habits of his family, who were of a military turn, he led a life of complete retirement at his native place, where his time was spent in literary pursuits and in the education, as is said, of his own children and those of his brother, one of whom became the celebrated Lord Fairfax. We learn from his own writings that he was neither 'a superstitious Papist nor a fantastic Puritan;' but farther particulars of his life there are none. He is supposed to have died about the year 1632.

Fairfax is now known only for his translation of Tasso's 'Jerusalem Delivered,' which is executed in a manner which makes it wonderful how the frigid, jingling, and affected version by Hoole ever survived its birth. The measure which he chose for his work (that of the original Italian) is one less stately perhaps than the Spenserian stanza, but not less fitted for heroic subjects. It consists of eight-line stanzas, of which the first six lines are in *terza rima* and the last two rhyme with each other. It has this great superiority over the common heroic couplet, that all jingle is avoided by the occasional introduction of a different species of rhyme. Moreover, the verses are much more harmonious than those of Hoole; the diction is more simple, and the English more pure. As the time is now gone by when Johnson gave the law in criticism, and Pope's method of versifying was the only one in repute, we may hope to see Fairfax's translation regain its ascendancy. We may now smile at the critic who asserts that Fairfax's translation 'is in stanzas that cannot be read with pleasure by the generality of those who have a taste for English poetry†;' but we must at the same time regret that a literary school like that of the followers of Pope should have usurped for so long a time such entire dominion as to enable one of its humblest members to make assertions so sweeping and insolent as those contained in the preface from which we have just quoted. (*Biographia Britannica; Preface* to Fairfax's *Tasso*, edition 1749. *Preface* to Hoole's *Tasso*.)

* He is said to have been illegitimate, but without sufficient proof.

† Hoole, Preface to his Translation of Tasso, p. xviii.

FAIRFAX, SIR THOMAS, afterwards Lord Fairfax, the son of Ferdinando Lord Fairfax and his wife, Mary, daughter of Edmund Sheffield, Lord Mulgrave, was born in the parish of Otley, at Denton, which is situated about 12 miles north-west of Leeds. He was sent from school to St. John's College, Cambridge; but we do not find that he was eminent as a scholar, for his disposition was inclined to military employment rather than to study. Accordingly, as soon as he left college, he enlisted in the army of Lord Vere, and served under his command in Holland. The connexion of Fairfax with Lord Vere afterwards became more close. When he returned to England, he married Anne, the fourth daughter of that peer, who, like her father, was a zealous Presbyterian, and disaffected to the king. If Fairfax did not already possess the same religious and political feelings, he soon imbibed the principles of his wife. When the king began to raise troops, as it was said, for the defence of his person, Fairfax, who foresaw that it was intended to collect an army, in the presence of nearly 100,000 people assembled on Heyworth Moor, presented a petition to the king in person, praying that he would listen to his parliament and refrain from raising forces. In 1642, when the civil wars broke out, he accepted a commission of general of the horse under his father, who was general of the parliamentary forces in the north. His first employment was in the county of York, where at first the greater number of actions between the parliamentary and royalist troops were in favour of the king, whose army was under the conduct of the earl of Newcastle. Sir Thomas Fairfax, somewhat dispirited, was despatched from Lincoln, where he was in quarters, to raise the siege of Nantwich, in Cheshire. In this expedition he was successful, not only in the main object, but he also took several garrisons, and on his return defeated the troops under Colonel Bellasis, the governor of York, and effected a junction with his father's forces (April, 1644). Thus Fairfax became master of the field, and, in obedience to his orders, proceeded towards Northumberland, to enable the Scots to march southwards, in spite of the king's forces, which were quartered at Durham. A junction took place between the Scots and Fairfax, who acted in concert during the spring (1644), and fought together in the memorable battle of Marston Moor (July 2, 1644), where the king's troops experienced such a signal defeat that the whole north, excepting a few garrisons, submitted to the parliament. Before Helmesley Castle, one of these fortresses, which Sir Thomas Fairfax was afterwards (September) sent to besiege, he received a wound in his shoulder that caused his life to be despaired of. When the earl of Essex ceased to be parliamentary general [ESSEX], it was unanimously voted that Fairfax should be his successor (January, 1644-5), and Cromwell by whom his actions were afterwards so greatly influenced, was appointed his lieutenant-general. Fairfax hastened to London, where, upon the receipt of his commission, the speaker paid him the highest compliments. After having been nominated governor of Hull, he marched to the succour of Taunton, in which place the parliamentary troops were closely besieged; but upon the king's leaving Oxford and taking the field with Prince Rupert, he was recalled before he had proceeded farther than Blandford, and received orders to join Cromwell and watchfully attend upon the movements of the king. On the 14th of June the decisive battle of Naseby was fought; and when the king had fled into Wales, Fairfax, marching through Gloucestershire, possessed himself of Bath, Bristol, and other important posts in Somersetshire. From thence, by the way of Dorsetshire, he carried his arms into Cornwall, and entirely dispersed the forces of the king.

After the surrender of Exeter, which was the last event of this western campaign, Fairfax returned to Oxford, which, as well as Wallingford, surrendered upon articles. In the autumn, after further active and successful employment, he was seized with a fit of illness, under which he laboured for some weeks. In November, when he returned to London, he was welcomed by crowds who came out to meet him on his road, was publicly thanked for his services, and received from the parliament a jewel of great value set with diamonds, together with a considerable grant of money. The payment of the 200,000*l.* to the Scottish army, in consideration of which they delivered up the king, was entrusted to Fairfax, who marched northward for this pur-

pose. The discontent of the army, who were fearful either that they should be disbanded or sent to Ireland, now rose to a great height. Their complaints were encouraged by Cromwell and Ireton; a council was formed in the army by selecting two soldiers from each troop, and the Independents showed an evident desire to form a party distinct from the Presbyterians and the parliament, and to usurp for themselves a greater authority. Although Fairfax was in his heart opposed to these violent proceedings, and saw them with regret, yet he had not the resolution to resign his command. He remained the tool of Cromwell, following his counsels, until the army had become master both of the parliament and the kingdom.

In 1647 he was made Constable of the Tower; and in the following year, at his father's death, he inherited his titles, appointments, and estates. The difference of his condition made no alteration in his life; he continued to attack or besiege the royalist troops wherever they were mustered or entrenched. Many towns in the east, and among them Colchester, which he treated with great severity, yielded to his arms. In December he marched to London, menaced the parliament, and quartered himself in the palace at Whitehall. He was named one of the king's judges, but refused to act; and he was voted one of the new council of state (February, 1648-9), but refused to subscribe the test. In May he marched against the Levellers, who were numerous in Oxfordshire. He continued in command of the army until June, 1650, when, upon the Scots declaring for the king, he declined marching against them, and consequently resigned his commission. He now retired to his house at Nun Appleton, in Yorkshire, which for some years he made his principal residence. He left it (in 1659) to assist General Monk against Lambert's forces. In January, 1659-60, he made himself master of York. In the same month and in the February following he was chosen one of the council of state by the Rump Parliament, was elected one of the members for the county of York, and formed one of the committee appointed to promote the return and restoration of Charles II. In November, 1671, while residing privately at his country-house, he was seized with an illness, which terminated in his death. He was buried at Bilburgh, near York. He left issue two daughters, Mary and Elizabeth. Mary married the duke of Buckingham; of Elizabeth we have no account.

The character of Fairfax was not distinguished for many vigorous qualities; the key to it may be found in the words of Clarendon: 'Fairfax wished nothing that Cromwell did, and yet contributed to bring it all to pass. He was courageous in battle, and sincere in his professions. He had an impediment in his speech: as an orator was not eloquent; as an author was indifferent: his love of literature was of no further benefit than as it served for the encouragement of others.' (Clarendon's *Hist.*; Whitelock's *Memorials*; Rushworth's *Coll.*; *Biog. Brit.*)

FAIRIES, a small sort of imaginary spirits of both sexes in human shape, who are fabled to haunt houses in companies, to reward cleanliness, to dance and revel in meadows in the night-time, and to play a thousand freakish pranks. Both sexes are represented generally as clothed in green, and the traces of their tiny feet are supposed to remain visible on the grass for a long time after their dances: these are still called fairy rings or circles. They are also fabled to be in the practice of stealing unbaptized infants and leaving their own progeny in their stead. Besides these terrestrial fairies there was a species who dwelt in the mines, where they were often heard to imitate the actions of the workmen, to whom they were thought to be inclined to do service. In Wales this kind of fairies were called 'knockers,' and were said to point out the rich veins of silver and lead. Some fairies are fabled to have resided in wells. It was also believed that there was a sort of domestic fairies, called, from their sun-burnt complexions, *Brownies*, who were extremely useful and who performed all sorts of domestic drudgery. The words fairy and browny seem at once to point out their own etymologies.

Bourne, in his 'Antiquitates Vulgares,' supposes the superstition relating to fairies to have been conveyed down to us by tradition from the Lamiæ, or antient sorceresses; others have deduced them from the lares and larvæ of the Romans. Dr. Percy tells us, on the assurance of a learned friend in Wales, that the existence of fairies is alluded to by the most antient British bards, among whom their commonest name was that of the Spirits of the Mountains. The most general conjecture, however, is, that these imaginary people are of oriental origin, and that the notion of them was first entertained by the Persians and Arabs, whose traditions and stories abound with the adventures of these imaginary beings. The Persians called them *Peris*, the Arabs *Ginn*; and the Arabs assigned them a peculiar country to inhabit, which they called *Ginnistan*, or fairy-land.

Shakspeare has been singularly happy in his dramatic exhibition of fairies. The belief in these fabled beings has still a fast hold upon the minds of many of our rustics, which may perhaps be considered as a remnant of that ignorant credulity which was once almost universal. Poole, in his 'English Parnassus,' has given the names of the fairy court: Oberon the emperor; Mab the empress: Perriwiggin, Perriwinckle, Puck, Hobgoblin, Tomalin, Tom Thumb, courtiers; Hop, Mop, Drop, Pip, Trip, Skip, Tub, Tib, Tick, Pink, Pin, Quick, Gill, Im, Tit, Wap, Win, Nit, the maids of honour; Nymphidia, the mother of the maids. Dr. Grey, in his Notes on Shakspeare, vol. i. p. 50, gives us a description, from other writers, of fairy-land, a fairy entertainment, and fairy hunting. Dr. King's description of Orpheus' fairy entertainment (*Works*, edit. 1776, vol. iii. p. 112), and 'Oberon's clothing' and 'Oberon's diet,' in Poole's 'English Parnassus,' almost exhaust the subject of fairy economy. A charm against fairies was *turning the cloak*. See Bishop Corbet's *Iter Boreale*. Anquetil du Perron's *Zend-Avesta*; Brand's *Popular Antiquities*, vol. ii. p. 327-350; Percy's *Reliques of Antient English Poetry*, 8vo. Lond. 1794, vol. iii. p. 207-215. The reader who would look further into fairy mythology may consult Sir Walter Scott's *Essay on the Fairy Superstition*, in the *Minstrelsy of the Scottish Border*; and more especially Keightley's *Fairy Mythology*, 2 vols. 8vo. 1828, in which the legends of different countries are collected.

FAITH (fides, in Latin), means belief or trust in a fact or doctrine, and is more especially used to express the belief of Christians in the tenets of their religion, and also by figure to mean that religion itself. The great divisions of Christianity, the Roman, the Greek, the Jacobite, the Reformed, or Calvinist, the Episcopal English, and the Protestant or Lutheran churches, have each separate confessions of faith, but they all acknowledge the great fundamental points of the Christian faith or religion, namely, the inspiration of the Scriptures, and the divinity of Jesus Christ. [CONFESSION.] In the earlier ages of the church the chief controversies of theologians, especially in the East, ran upon metaphysical questions concerning the mysteries of the Trinity, the Incarnation, and the divine nature of the Saviour. In modern times controversy has run more frequently upon moral questions concerning the conduct of men, the requisites of salvation, and the discipline of the Church. Faith, the necessity of which is acknowledged by all Christians, has been viewed in various lights with respect to its efficacy. From the earliest ages the Church has taught that faith, or belief in the Redeemer, joined with good works, was necessary for the justification of man; that good works, that is, works acceptable to God, could only be produced by the Spirit of God influencing the heart, but that the human will must co-operate with grace in producing them, though the human will alone is powerless to good unless assisted by divine grace. Still, man being a free agent, the will can call on God, through the merits of the Saviour, for a measure of his grace to assist its own efforts. Thus the co-operation of God and man was held as the means of the justification and salvation of the latter. Luther however and Calvin denied the power of the will to call on God for his grace; they substituted faith, and faith alone, in the merits of the Redeemer, as the means of salvation, by which faith man firmly believes that his sins are at once remitted. But this faith must be sincere, absolute, without a shadow of doubt or distrust; and as man cannot of himself obtain this, it can only be given to him by inspiration of the Spirit of God. Here the question of faith becomes involved with those of grace and predestination. As for our works, both Luther and Calvin look upon them as absolutely worthless for our salvation. Some fanatics, and the Anabaptists among the rest, drew from these premises of the leading reformers some very dangerous consequences, which Luther and Calvin had not anticipated, such as that men might live as profligately as they pleased, and yet, by the inspiration of divine grace, might obtain the faith requisite for their salvation.

The opinions of Luther and Calvin on the subject of faith and predestination have been since considerably modified by many Protestant divines, who have admitted that the will of man must co-operate in order to obtain the grace necessary for justification. The Roman Catholic church admits the merit of good works and repentance, united with faith, for the purpose of salvation. But then, it requires an absolute faith in all the decisions of its General Councils in matters of dogma, without the least liberty of investigation on the part of the laity, and without any doubt, for doubt itself is held to be sinful. The Reformed and Protestant churches, generally speaking, hold faith in the fundamental dogmas of Christianity as an essential requisite for salvation.

FAKENHAM. [Norfolk.]

FAKI'R, an Arabic word meaning poor, which is applied to the ascetics of several parts of the eastern world. In this sense it is synonymous with the Persian and Turkish derwish. The word fakir is chiefly used in India. There are fakirs who live in communities like the monks of the western world, and others who live singly as hermits, or wander about exhibiting strange displays of self-penance and mortification. Many of them are considered as hypocrites, and others are fanatics or idiots. [Derwish.]

FALAISE, a town in France, the capital of an arrondissement, in the department of Calvados, near the source of the river Anté, which flows into the Dives: it is 127 miles from Paris, through Versailles, Dreux, Verneuil, and Argentan; in 48° 53′ N. lat. and in 0° 14′ W. long. The antient castle of Falaise was one of the residences and strong-holds of the dukes of Normandie, and here William the Conqueror was born: it sustained fourteen sieges at different times, in the early troubles of the duchy of Normandie; in the wars of Henry I. of England with his brother Duke Robert and the Norman lords; in the invasion of France by Henry V. (A.D. 1417); in the expulsion of the English from France (A.D. 1450): and in the war of the League, in which Falaise was taken by Henri IV. in person (A.D. 1589). The fortifications, which were much injured in these attacks, are at present in a very dilapidated state: the donjon of the castle, situated on a bold and lofty rock, in the suburb of Guibray, is one of the proudest relics of Norman antiquity: its walls are in some parts eight or nine feet thick.

The town stretches along the top of a rocky ridge which rises abruptly from a fertile and well-wooded valley. The streets are wide, and the public fountains impart a freshness to the appearance of the place. Before the Revolution, there were twelve churches: there are now only four; two in the town, and two in the suburbs.

The population in 1832 was 9419 for the town, or 9581 for the whole commune. The inhabitants carry on a considerable manufacture of cotton yarn and hosiery. There is a large fair held in the suburb of Guibray, which is much frequented: it continues from the 15th to the 30th of August: many Norman horses are sold. This town has a tribunal de commerce, or court for commercial affairs, a high school, an agricultural society, and a theatre.

The arrondissement of Falaise contained, in 1832, a population of 62,349. The chief manufactures carried on in it are leather and paper: there are also many oil-mills.

FALAJAS. [Abyssinia, p. 58.]

FALCO. [Falconidæ.]

FALCON. [Falconidæ.]

FALCONER, WILLIAM, was born about the year 1730, being one of a large family, all of whom, except himself, were deaf and dumb. When very young, he served his apprenticeship on board a merchantman, and was afterwards second mate of a vessel in the Levant trade, which was shipwrecked on the coast of Attica, himself with two others being the only survivors. This event laid the foundation of Falconer's fame, by forming the groundwork of 'The Shipwreck,' which poem he published in 1762. The notice which the poem received enabled him to enter the navy, during the ensuing year, as midshipman in the Royal George. After some other appointments, he became purser to the Aurora frigate, and was lost in her somewhere in the Mozambique Channel, during the outward voyage to India, in the winter of 1769.

Falconer was the author of a 'Nautical Dictionary' of considerable merit, as well as of some minor poems; but his chief claim to reputation consists in 'The Shipwreck,' the merit of which is owing to the vividness and power of description which pervade the work, and to the facility the author has shown in introducing nautical language. His style is formed on a model which may now be thought erroneous, and is certainly the most artificial imaginable—that of Pope; and the mixture of phrases, such as 'weather back-stays,' 'parrels, lifts, and clew-lines,' with the affectations of 'nymph,' 'swain,' 'Paphian graces,' &c., form rather a ludicrous contrast. To call 'The Shipwreck' a first-rate poem, or to compare it with the Æneid of Virgil, would not now enter into many men's thoughts, although this was done at the time when it first appeared. Some might even assert that where there is no imagination, there is no poetry; but with all these limitations we must allow that Falconer has done what no one else ever attempted, and we must give him a high place among the writers of didactic poems.

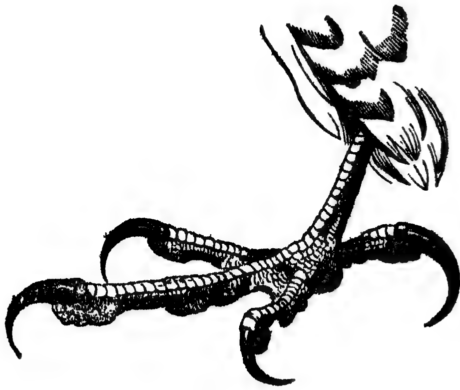
(See Clarke's and Pickering's editions of *The Shipwreck*; Irving's *Life of Falconer*; Chalmers's *Biog. Dict.*)

FALCONET, ETIENNE, was born at Paris in 1716, of poor parents, of a family originally from Savoy. He studied sculpture under Lemoyne, whom he soon surpassed. He executed several groups and statues, which are at Paris, in the church of St. Roch, in the Musée des Monumens Francais, and in several private collections. In 1766 he accepted the invitation of Catherine II. to repair to Petersburg, in order to execute the colossal statue of Peter the Great. He remained in that capital twelve years, during which he completed his work, which is now in the square called the Square of the Senate, and is perhaps the finest specimen of an equestrian statue existing. As he and the Russian founder appointed to cast the statue could not agree, Falconet cast it himself. He placed it upon an enormous block of granite, weighing about 1700 tons, which was found in some marshy ground at a considerable distance from Petersburg, and was brought to the capital by machinery. Catherine, who had shown him the greatest attention during the first years of his residence in the Russian capital, grew cool towards him at last, owing to the misrepresentations of some of her courtiers. Falconet returned to Paris in 1778. In May, 1783, as he was going to set off for Italy, a country which he had never visited, he had a paralytic stroke. He survived this misfortune several years, and died in January, 1791. In temper he was eccentric and blunt, but generous and warm-hearted. While at Petersburg he kept up a correspondence with Diderot, which is printed in Diderot's works. He wrote strictures and commentaries on the books of Pliny which treat of the sculpture and painting of the antients: he also wrote 'Observations sur la statue de Marc Aurèle,' in which he does not share in the admiration expressed by many for that work. In general, Falconet had no great veneration for antient art. All his writings were published under the title, 'Œuvres Complètes de Falconet,' 3 vols., 8vo., Paris, 1808, to which is prefixed an account of his life.

FALCO'NIDÆ, Leach's name for a family of *Raptorial Birds*, or birds of prey. (*Raptores* of Illiger.) In this family the destructive power is considered by all zoologists to be most perfectly developed; and we find in the birds composing it natural instruments for striking, trussing, and dissecting their prey, combined with a power of flight and strength of limbs equivalent to the necessities of the case, whether the prey be aërial, that is, whether it be the habit of the raptorial bird in question to strike down its quarry while the latter is in the act of flight, or whether the prey be terrestrial, or, in other words, captured on the ground. Of these natural weapons some idea may be formed from the cuts here given,—



Bill of the Peregrine Falcon.

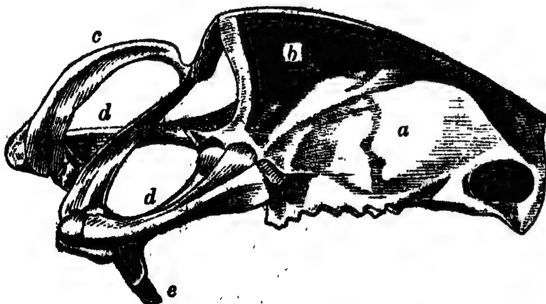


Foot of the Peregrine Falcon.

and they are rendered still more formidable by the organization of the whole animal, which is calculated to give them the greatest possible effect. The nails or claws, to be available, must be sharp; and in order that they may be kept in this state and fit for duty, there is a provision to enable the bird to prevent them from coming in contact with the ground or other foreign hard bodies: for the claws are retractile, not indeed in the same manner as those of the cats [FELIS], which have the power of withdrawing or sheathing theirs within the integuments, but by a conformation which gives the bird of prey the power of elevating its claws at pleasure. The claws of falcons when sitting on stones or large branches of trees have often a cramped appearance; but this arises in most instances from the care of the bird so to arrange its talons that their points may not be blunted against the perch.

ANATOMY.

The power of flight, as Mr. Yarrell observes in his memoir *On the Anatomy of Birds of Prey* (Zool. Journ. vol. iii. p. 181), is one of the decided marks of the distinct organization of birds; and, as one division of the first genus, *Falco*, appears to possess this power in the highest degree of perfection, he proceeds to consider the conditions necessary to produce such a degree. These, he observes, are large and powerful pectoral muscles; great extent of surface, as well as peculiarity of form in the wing; and feathers of firm texture, strong in the shaft, with the filaments of the plume arranged and connected to resist pressure from below. 'A certain degree of specific gravity,' continues Mr. Yarrell, 'is necessarily imparted by large pectoral muscles, and the power of these muscles may be estimated by the breadth of the sternum and the depth of its keel, as affording extent of surface for the attachment of the large muscle by which the wing is depressed. As an illustration of this form the breast-bone of the peregrine falcon (*Falco peregrinus*) is represented, which ex-



Breast-bone of the Peregrine Falcon (Yarrell) reduced. *a*, the sternum; *b*, the keel; *c*, the furcula, or os furcatorius; *d d*, the clavicles; *e*, the scapula broken off.

hibits the breadth of the sternum, the depth of the keel, as well as the strength of the clavicles; and the power of flight peculiar to all the species of true falcons is still further illustrated by the form and substance of the *os furcatorius*, which is circular, broad, and strong, affording a permanent support to the shoulders. That the long and acuminated form of the wing in the true falcons, with each feather narrow, firm in consistence, the second the longest, and all gradually tapering to a point, is also best adapted for rapidity of motion, may be inferred from the example in the various species of the genera *Hirundo*, *Scolopax*, *Tringa*, *Charadrius*, *Procellaria*, *Sterna*, &c.; but that extent of surface and this peculiarity of form in the wing are not in themselves sufficient alone to afford rapid flight, is proved in the genus *Larus*, the species of which, though capable of exercising their immense pinions with graceful ease for hours in succession, without any apparent lassitude, are still incapable of rapid flight, for want of strong pectoral muscles. The numerous examples also furnished by the *Gallinaceous* tribe sufficiently evince that immense pectoral muscles are insufficient when coupled with a small round wing, and afford but a short flight, sustained with great labour, rapid in a small proportion only to the strength and repetition of the impulse, and accompanied by a vibration too well known to need further remark. So material also is the perfection of the feather in the genus *Falco*, that when any of those of the wing or tail are broken, the flight of the bird is so injured that falconers find it necessary to repair them. For this purpose they are always provided with pinion and tail feathers accurately numbered, and the mode of uniting the more perfect feather to the injured stump is described in Sir John Sebright's excellent observations on hawking.' The reader who is disposed to go farther back will find in the 'Booke of Falconrie or Hawking,' &c., &c., 'heretofore published by George Turbervile, Gentleman,' (London, small 4to., 1611,) the following chapters:—'Of Accidents that happen and light uppon a hawkes feathers, and first how to use the matter when a feather cannot be ymped.' 'The way and manner how to ympe a hawks feather, howsoever it be broken or bruised;' and four methods of operating, according to the circumstances, are detailed. 'How to ympe the trame of a hawke beeing all broken, and never a feather whole or sound.' Mr. Yarrell proceeds to observe that it is difficult to estimate the comparative rapidity of flight in different birds, and that our pigeons may appear to possess this advantage in a degree little inferior to the true falcons: but, he adds, the fact is that these birds are deficient in natural courage, and are unable, under circumstances, to avail themselves of those powers with which they are gifted.

'The bodies of all the species of true falcons,' writes Mr. Yarrell in continuation, 'when denuded of their feathers, are triangular in form, broad at the shoulders and tapering gradually to the tail, the muscles of the thighs and legs of great size; but these characters are less prominent in the hawks, the bodies of which are more lengthened, the legs long and slender, the pectoral muscles smaller, the wing rounded in form, the fourth feather the longest, the wing primaries broad in the middle, the inner webs overlapping the feather next in succession, and emarginated towards the end. These two divisions of the genus *Falco*, although the latter are unequal to the former in powers, are remarkable for their bold character and rapid flight, their invariable mode of striking their prey on the wing, as well as the instinctive knowledge by which they are directed to destroy life, attacking the most vital part, and penetrating the brain with their sharp hooked beak, either by one of the orbits where the bone is very thin, or at the junction of the cervical vertebræ with the occiput.

'On comparing the bones of our two British eagles, the greater power of flight appears to belong to the *Albicilla*, that of prehension to the golden eagle, but both exhibit various indications of great strength.

'By an extended examination of the different species of buzzards and harriers, it will be found that the characters described as necessary to produce rapid motion decline gradually. The sternum decreases in size, the keel loses part of its depth, the clavicles and furcula become more slight, while the form of the cranium, the loose ruffled feathers of the neck, as well as the general downy texture of the plumage, indicate the approach to the genus next in succession. Of the bones of the different species of the genus *Falco* generally, it may be added, that they are remarkable for their strength, such as are cylindrical being furnished with numerous transverse bony processes within the tubes, and the distribution of air throughout their internal cavities. The humerus is supplied with air through several orifices upon its inner and upper surface, and some difference will be found in the angle at which this bone is articulated with the clavicle to accomplish the ascending flight of the sky

lark, in contradistinction to the precipitous horizontal direction of the falcons. The thigh bone is also supplied with air by an orifice at the situation which answers to the front of the great trochanter; the large bones forming the pelvis, the vertebræ, sternum, furcula, clavicles, scapulæ, and even the ribs, are all furnished with apertures for the admission of air, supplied from the various cells of the abdomen, sides, and thorax. This distribution of air to the bones does not seem however to be absolutely necessary for flight, since the young birds of our summer visitors appear to perform their first autumnal migration with perfect ease and celerity, at an age when the cavities of their bones are filled with marrow.

'The various characters of the feet are too obvious to require particular notice.'

The reader is referred to the article BIRDS for the details of the rest of the skeleton of the *Falconidæ*, as exemplified in the *Sparrow Hawk* (vol. iv., pp. 424, 425); and we shall now endeavour to give a sketch of the other internal parts worthy of notice, and especially of the organs of the senses.

Organs of Digestion.—In the Museum of the Royal College of Surgeons in London (Physiological Series), the reader will find a preparation (Gallery, 522 A.) of the stomach of the golden eagle. It is laid open, so as to show the orifices of the numerous gastric glands of the proventriculus, the smooth lining membrane of the gizzard, and the valvular structure of the pylorus. The œsophagus is very wide, so that externally it appears to form one continued cavity with the proventriculus and stomach. On the outer surface of the latter may be observed the two shining tendons from which the muscular fibres radiate; these however form a very thin layer in this and other carnivorous birds. A small quill is passed through the pylorus, which is guarded within by three cuticular tubercles, two on the upper side of the orifice and one below which fits into the interspace of the preceding. The crop has not been preserved in this preparation. (*Cat., Physiol. Series*, vol. i.) John Hunter, in his 'Observations on Digestion' (*Animal Œconomy*), says, 'There are few animals that do not eat flesh in some form or other, while there are many who do not eat vegetables at all; and therefore the difficulty to make the herbivorous eat meat is not so great as to make the carnivorous eat vegetables. Where there is an instinctive principle in an animal, directing it either to the one species of food or the other, the animal will certainly die rather than break through of its own accord that natural law; but it may be made to violate every natural principle by artificial means. That the hawk tribe can be made to feed upon bread I have known these thirty years; for to a tame kite I first gave fat, which it ate very readily; then tallow and butter; and afterwards small balls of bread rolled in fat or butter; and by decreasing the fat gradually, it at last ate bread alone, and seemed to thrive as well as when fed with meat. This, however, produced a difference in the consistence of the excrements; for when it ate meat, they were thin, and it had the power of throwing them to some distance; but when it ate bread, they became firmer in texture, and dropped like the excrement of a common fowl. Spallanzani attempted in vain to make an eagle eat bread by itself; but by inclosing the bread in meat, so as to deceive the eagle, the bread was swallowed and digested in the stomach.'

Mr. Yarrell observes, that the œsophagus offers nothing peculiar beyond that of other birds not possessing the power of minutely dividing their food. It is plicated lengthways, allowing great extension, and its separation from the stomach is marked by a zone of gastric rings. The same author notices an opportunity which occurred to him of observing the castings or pellets of some eagles, which had been occasionally fed with dead pigeons. These castings showed that the vegetable food, such as pease, wheat, and barley, which had been swallowed by the eagles in the crops of the pigeons, remained entire, but somewhat enlarged and softened by heat and moisture. In these cases no part of the bones remained.

The intestines of the *Falconidæ* are in general short and large, but Mr. Yarrell remarks that the Osprey is an exception to this rule, and that to the thin membranous stomach of this bird there is attached an intestinal canal measuring 10 feet 8 inches in length, and in some parts scarcely exceeding a crow-quill in size. The canal in most of the species, he adds, is in length, compared with that of the bird itself, as three to one; but in the Osprey it is as eight to one: and he observes that in the otter the intestinal canal is very long, equal in size, and without cæcal appendage; the seal, too, has long intestines with a small cæcum. Mr. Yarrell inquires therefore if it may not be concluded that the small quantity of nutriment which fish, as an article of food, is known to afford, renders this extent of canal necessary in order that every portion may be extracted. The cæca of the *Falconidæ* amount to no more than minute rudiments.

Organs of Respiration.—There is nothing very remarkable in these organs among the Falconidæ. The trachea is composed of two membranes, inclosing between them numerous bony rings, forming a more or less perfect tube. The rings are strong and compressed. The point of divarication, the cross-bone and bronchiæ constituting together the inferior larynx, are of the most common form, having but one pair of muscles attached; and the voice, though powerful, possesses, as might be expected, but little variation. (Yarrell.) *Falco musicus* seems, however, to be an exception, and it would be desirable to examine its trachea for the purpose of ascertaining whether it is not organized more after the fashion of that of the singing birds.

Organs of Sense.—Touch.—It might be expected that in the *Falconidæ* the soles of the feet and lower surfaces of the toes which come so closely into contact with the living prey would be endowed somewhat more largely with the sense of touch than those of birds which have no such habits; accordingly, we find in the Museum of the College of Surgeons (Physiological Series) a preparation (No. 1400) of one of the feet of an eagle, with the cuticle removed, showing the papillæ and cushions of the cutis on the under surface of the foot.

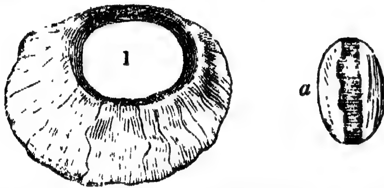
Taste.—In the same Museum (same series, No. 1482) will be found the tongue, larynx, and lower jaw of the Golden Eagle (*Aquila chrysaëtos*). The tongue is fleshy and large, divided into two lateral portions by a deep longitudinal furrow; at its base is a series of small retroverted spines, arranged in the form of a chevron, between which and the larynx the surface is studded with the orifices of numerous glandular follicles: two rows of retroverted spines again occur behind the larynx. There is a row of glandular follicles on either side of the frænum linguæ, and a large cluster of similar orifices immediately anterior to it. The preparations No. 1483 and 1484 exhibit respectively the tongue and fauces of an Erne (*Haliæetus albicilla*), and the tongue and larynx of an Osprey (*Pandion haliæetus*).

Smell.—A longitudinal section of the anterior part of the head of the Golden Eagle will be found in the same Museum and series (No. 1538). The preparation shows the turbinated cartilages and cavity of the nose, together with part of the orbit and the air-cell continued from it anteriorly, and situated below the nose. The parts are minutely injected, and the vascularity of the pituitary membrane covering the middle turbinated cartilage is well displayed. No. 1539 is a transverse section of the head of an Erne (*Haliæetus albicilla*), showing the convolutions of the middle turbinated cartilages, and the disposition of the pituitary membrane, which is thickest on the convex or mesial side of the convolutions. The air-cells in the superior maxillary bones, and their communications with those which are situated in front of the eye-ball, are well seen in this preparation. Bristles have been inserted into the lachrymal ducts, and into the common termination of the Eustachian tubes, the respective conduits of the eye and ear for conducting their superfluous moisture to the nasal passages. An anterior transverse section of the head of the same eagle is shown in No. 1540, which exhibits the external nostrils, the anterior terminations of the middle turbinated cartilages, and of the lachrymal ducts, in which bristles are placed; together with the communications of the maxillary air-cells with the cancellous structure of the upper mandible. (*Cat. Gallery*, vol. iii.)

Hearing.—Nothing remarkable.

Sight.—'The extraordinary powers of vision,' says Mr. Yarrell, 'which birds are known to exercise beyond any other class of animals are in no genus more conspicuous than in that of *Falco*. Their destination, elevating themselves as they occasionally do into the highest regions, and the power required of perceiving objects at very different distances and in various directions, as well as the rapidity of their flight, seem to render such a provision necessary. The eyes of birds are much larger in proportion than those of quadrupeds, and exhibit also two other peculiarities. The one is the marsupium, a delicate membrane arising at

the bottom of the eye, and terminating at or near the edge of the crystalline lens: the other is a ring of thin bony plates, enveloped by the sclerotic coat. Comparative anatomists do not seem to be agreed as to the means by which birds obtain their power of vision, whether by an alteration in the form or situation of the crystalline lens, or by both, either or both of which, the greater quantity of aqueous humour which birds are known to possess would seem to facilitate. The existence of muscle attached to the inner surface of the bony hoop of the sclerotica, and inserted by a tendinous ring into the internal surface of the cornea, as shown by Mr. Crampton,* by which the convexity of the cornea may be altered, gives a still greater scope of action, since with two or at the utmost three varieties of powers, the sphere of distinct vision may be indefinitely extended. Whether the five species called the True Falcons possess, with their exclusive rapidity of flight, any power of vision beyond their generic companions, would be difficult to ascertain; but it may, while on this subject, be worthy of remark, that the irides of the *Gyrfalcon, Peregrine, Hobby, Merlin,* and *Kestrel,* are hazel-brown, or still darker, while those of all the hawks, buzzards, harriers, and kites, are of various shades of yellow. I refer only to adult birds, and do not remember a single exception.'



1, bony ring of a Golden Eagle; 2, crystalline lens of the same bird; *a*, the anterior surface, somewhat less convex than the posterior one (Yarrell).

Mr. Yarrell observes, that the number of bony plates forming this circle in the Golden Eagle is fifteen; in the White-tailed Eagle there are but fourteen: and he adds, that the external convex form of the bony ring in the Golden Eagle will be found to extend through all the species of every genus of British birds, except the owls, in all of which it is concave.

In the Museum of the College of Surgeons (*Physiological Series, Gallery*) are the following preparations illustrative of this part of the subject. No. 1741. The head of an eagle, with the eyes *in situ*. In the left eye the anterior part of the tunics and the humours have been removed to show the retina expanding from the oblique line by which the optic nerve terminates, and the vascular processes of the *marsupium* extending forwards from the centre of the optic fissure. In the right eye a lateral section of the coats has been removed, together with the humours and a great part of the *retina*, showing the uniformly dark-coloured choroid, the thin but dense texture of the *sclerotica*, and the zone of osseous plates which supports the projecting *cornea*. The *marsupium* is preserved *in situ*. It is of an unequal quadrilateral figure, broadest below, and extending upwards and inclined a little backwards, with a slight convexity towards the nasal side of the eye-ball. The large size of the eyes is worthy of notice. No. 1742 exhibits a longitudinal section of the eye of an eagle, showing the oblique manner in which the optic nerve perforates the *sclerotica* and its extended termination, from which the *retina* expands in a plicated manner: only the folds at its origin are here preserved. The parts being minutely injected, the vascularity of the choroid is shown; also the breadth of the ciliary zone, the breadth and thickness of the bony imbricated hoop surrounding the base of the *cornea*, the thickness of the *cornea* itself, and the large size of the anterior chamber of the eye. No. 1743 is the eye of an eagle, with a portion of the coats removed from one side, showing the folds of the marsupial membrane, from which the colouring matter has been removed. In No. 1538 above alluded to portions of the eye and eye-lids with the nictitating membrane are preserved, showing the situation of the two *puncta lachrymalia*, through which bristles are passed along the ducts to the nose; and in No. 1539, at the back part of the preparation, the left eye-ball is laid open, showing the marsupial membrane. The right eye-ball is entire, and the *abductor, attollens,* and *deprimens oculi*, together with the *quadratus* and *pyramidalis* muscles of the *membrana nictitans*, are well displayed. See also No. 1540, as referrible to the organs of vision. No. 1796 exhibits the eye-ball, with portions of the horizontal eye-lids, the vertical eye-lid, or *membrana nictitans*, of an eagle. The *quadratus nictitantis* may be observed to have a more extensive origin than in the ostrich and both muscles of the third eye-lid are relatively larger. The *cornea* is cut away, and the nictitating membrane raised, to show the termination of the duct of the Harderian gland, in which a bristle is placed. Bristles are also placed through the two *puncta lachrymalia*. The round and slightly concave tarsal cartilage of the lower eye-lid may be observed: the upper lid has no tarsal cartilage. In No. 1797 the three eye-lids of an eagle are exhibited, and the tarsal cartilage, which is raised as in the act of closing the eyes, is shown. (*Cat. Gallery*, Physiol. Series, vol. iii.)

* Annals of Philosophy for March, 1813

NATURAL HISTORY.

Aristotle divided the *Falconidæ* into 'Αετοὶ or Αἰετοὶ (Eagles), 'Ιέρακες (Hawks), and 'Ικτῖνοι (Kites), with many subdivisions. Mr. Vigors is of opinion that the division 'Ιέραξ (Hierax) of Aristotle comprises all the Falconidæ of Vigors which belong to the stirpes or sub-families of *Hawks, Falcons,* and *Buzzards*. Pliny separates the group into *Aquilæ* (Eagles) and *Accipitres*, a general term comprising as used by him, the rest of the *Falconidæ*. The subdivisions of both Aristotle and Pliny do not differ much from the subdivisions of some of the modern zoologists.

Belon, beginning with the Vultures, proceeds from them to the Eagles; thence to the *Gerfault*, which he gives as the *Morphnos, Morphna, Nittophonos, Plangos, Plancus, Plangus,* and *Clangus* of the Greeks, and *Anataria* of the Latins; next he places the *Orfraye*, which he makes the *Haliæetus* of the Greeks, the *Aguista piombina* of the modern Italians, and gives *Aquila marina* as the Latin name. He then treats of the *Ossifragus* as the *Phinis* of the Greeks, *Aquila barbata* in Latin, recording it provisionally as a species of *Vulture* (*Petit vautour*), and next describes the *Buzzard* (Buse ou Busard) as a kind of *bastard Eagle*, and as the *Gypäetos, Percnopterus,* or *Oripelargus* of the Greeks. Then comes the *Goiran* or *Boudree*, which he describes as living upon rats, mice, frogs, lizards, &c., caterpillars, and sometimes slugs and serpents, asserting that it becomes very fat, and that it is taken frequently in winter for the sake of its flesh, which is good for food. This he supposes to be the *Hierax*, called *Phrynolochos* by the Greeks, and gives *Rubetarius Accipiter* as the Latin name. *Jean le Blanc*, or *Oyseau Saint Martin*, which he considers to be the *Pygargus* of the Greeks, follows, and is succeeded by another *Oyseau Saint Martin*, or *Blanche-queuë*. Belon then gives an account of the birds of prey employed in falconry. The *Sacre* and her *Sacret*, the *Autour* and her *Tiercelet*, the *Fau-perdrieux* (Circus?), and the *Falcons* generally, with their *Tiercelets*.* He then describes the *Hobreau* (Hobby?), the *Esmerillon* (Merlin?), the *Espervier* (Sparrowhawk?), the *Lanier* and *Laneret*, and the *Cresserelle* (Kestrel?). Next follow the *Butcher-birds*, then come the *Kites* (Milan Royal, Milan Noir—Milvus), and (the *Cuckoo* intervening from a supposed similitude to the Birds of Prey) the *Owls*.

Passing by Gesner, Aldrovandus, and Jonston, we pause to notice Willughby's arrangement. He separates the carnivorous and rapacious birds, called *Birds of Prey*, into the *Diurnal* (those that prey in the day-time) and the *Nocturnal* (those that fly and prey by night). The following is his table of the *Diurnal* section.

- Diurnal
  - The *Greater*, and these either
    - The *more generous*, called *Eagles*: the *Golden Eagle*, the *Sea-Eagle*, the *Black Eagle*, &c.
    - The *more cowardly* and *sluggish*, called *Vultures*.
  - The *Lesser*, called in Latin *Accipitres*
    - The *more generous*, that are wont to be reclaimed and manned for fowling, called *Hawks*, which our falconers distinguish into
      - *Long-winged*, whose wings reach almost as far as the end of their train, as the *Falcon*, *Lanner*, &c.
      - *Short-winged*, whose wings when closed fall much short of the end of their trains, as the *Goshawk* and *Sparrowhawk*.
    - The *more cowardly* and *sluggish*, or else *indocile*, and therefore by our falconers neglected, and permitted to live at large
      - The *Greater*.—The *Common Buzzard*, *Bald Buzzard*, &c.
      - The *Lesser*
        - *European*; BUTCHER BIRDS or SHRIKES.
        - *Exotic*; BIRDS OF PARADISE.

* It is a general rule that, in the *Falconidæ*, especially among the nobler birds of prey, the female is larger than the male.

Ray, in his 'Synopsis,' follows Willughby, and both Ray and Willughby place the Cuckoo after their Diurnal Birds of Prey and immediately before the Nocturnal.

Brisson's third order consists of birds with a short and crooked beak, and the first section contains the genera *Epervier* (Hawk), *Aigle* (Eagle), and *Vautour* (Vulture).

Linnæus makes his first order, *Accipitres*, consist of the genera *Vultur*, *Falco*, *Strix*, and *Lanius*. The genus *Falco* contains the elements of the different branches of the family of *Falconidæ*.

Without entering into the methods of Buffon, Schœffer, and Scopoli, we proceed to that of Latham, who made the *Accipitres* his first order of Terrestrial Birds, containing the genera *Vulture*, *Falcon*, and *Owl*.

Pennant makes the *Rapacious Birds* (his first section) consist of two genera only, viz. *Falcon* and *Owl*.

M. de Lacépède placed the *Birds of Prey* (his seventh order) at the head of his second Division of Birds. His genera are *Vultur*, *Gypaëtos* (Griffon), *Aquila*, *Astur*, *Nisus*, *Buteo*, *Circus*, *Milvus*, *Falco*, and *Strix* (Owl).

M. Duméril divided his first order, *Rapaces*, into three families; the first *Nudicolles* or *Ptilodères*, consisting of the genera *Sarcoramphus* and *Vultur*; the second *Plumicolles* or *Cruphodères*, containing the genera *Griffon*, *Messager*, *Aigle*, *Buse*, *Autour*, and *Faucon*; and the third the *Nocturnes* or *Nycterins* (Owls).

Blumenbach's first order, *Accipitres* (Birds of Prey, with strong hooked bills and large curved talons, a membranous stomach, and short cæca) consists of the genera *Vultur*, *Falco*, *Strix*, and *Lanius*.

Meyer's first order, *Rapaces*, is divided into two suborders: first, the *Scleropteræ*, or *Diurnal Birds of Prey*; second, the *Malacopteræ*, the *Nocturnal Birds of Prey*.

The third order of Illiger, *Raptatores*, is composed of the *Nocturni* (Strix), the *Accipitrini* (Falco, Gypogeranus, Gypaëtus), and the *Vulturini* (Vultur, Cathartes).

Cuvier divides his first order (the Birds of Prey) into *Diurnal* and *Nocturnal*. The first are subdivided into the *Vultures* and the *Falcons* (Falco, Linn.), which last are separated into the *Noble Birds of Prey*, or *Falcons properly so called* (Falco of Bechstein), comprising the genera *Faucon* (Falco) and the *Gerfaults* (Gyr-falcons, *Hierofalco* of Cuvier); and the *Ignoble Birds of Prey*, consisting of the *Eagles* (Aquila of Brisson), which are subdivided into the *Eagles properly so called* (Aquila of Cuvier), the *Aigles-Pêcheurs* (Fishing Eagles, with comparatively long wings, *Haliæetus* of Savigny), the *Balbusards* (Pandion of Savigny), the *Circaètes* (Circaetus, Vieillot, *Jean le Blanc*, &c.), the *Caracaras*, (Polyborus, Vieillot, and Ibycter, Vieillot), and the *Harpies* or Fishing Eagles, with short wings, (Harpyia of Cuvier; the tribe *Cymindis* of Cuvier; the *Aigles-Autours* (Morphnus of Cuvier, Spizaëtos of Vieillot); the *Autours* (Astur of Bechstein, Dædalion of Savigny); the *Milans* (Milvus of Bechstein, Elanus of Savigny); the *Bondrées* (Pernis of Cuvier, Honey Buzzard); the *Buses*, Buteo of Bechstein; the *Busards* (Circus of Bechstein); and the *Messager* or *Secrétaire* (Serpentarius of Cuvier, Gypogeranus of Illiger).

Vieillot divides his first order, *Accipitres*, into the *Diurnal* and *Nocturnal* tribes, making the first tribe to consist of three families; 1st. *Vautourins*, among which he places the *Caracara*; 2nd. *Gypaëtes*; 3rd. *Accipitrins*, consisting of the genera *Aigles*, *Pygargue*, *Balbuzard*, *Circaëte*, *Busard*, *Buse*, *Milan*, *Elanus*, *Ictinie*, *Faucon*, *Physète*, *Harpie*, *Spizaëte*, *Asturine*, *Epervier*.

Temminck's first order, *Rapaces*, comprises the genera *Vautour*, *Catharte*, *Gypaëte*, *Messager*, *Faucon*, *Chouette*.

Mr. Vigors thus arranges the *Falconidæ*.

TYPICAL GROUPS.

Beaks short, strongly toothed. Prey aërial.	Wings short.	Sub-family, *Accipitrina*. HAWKS.
	Wings long.	Sub-family, *Falconina*. FALCONS.

ABERRANT GROUPS.

Beaks long, or sublong, not toothed. Prey terrestrial.	Beaks hooked (adunca) from the base. Wings long.	Sub-family, *Buteonina*. BUZZARDS.
	Beaks hooked from the base; Tail forked. Wings very long.	Sub-family, *Milvina*. KITES.
	Beaks hooked at the apex only. * Long-winged. ** Short-winged.	Sub-family, *Aquilina*. EAGLES.

De Blainville divides the *Raptatores* into the *Diurnal* and the *Nocturnal*. The former he divides into the *Anomalous* (the Secretary, Serpentarius); and the *Normal* (Falco, Linn.).

M. Latreille separates his first order of terrestrial birds (*Rapaces*) into two tribes—the diurnal and the nocturnal. The first contains two families: 1st, The *Vautourins* (Vultures); 2nd, The *Accipitrins*. The latter consists of the genera *Aigle*, *Pygargue*, *Balbuzard*, *Harpie*, *Aigle-Autour*, *Asturine*, *Messager*, *Autour*, *Epervier*, *Elane*, *Milan*, *Bondrée*, *Buse*, *Busard*, *Faucon*, *Gerfault*.

C. L. Bonaparte (Prince of Musignano), in his 'Tabella Analitica,' divides his 'Ordine' *Accipitres* into the 'Famiglia *Vulturini*,' and the 'Famiglia *Rapaces*.' These last he separates into the *Diurni*, with eyes on the sides of the head, 'Occhi nei lati,' and the *Nocturni*, with eyes in the face, 'Occhi sulla faccia.' His diurnal rapacious birds consist of two genera, viz., *Gypaëtos* and *Falco*. The latter comprises the following sub-genera:—*Aquila*, *Haliaëtos*, *Pandion*, *Falco*, *Astur*, *Milvus*, *Elanus*, *Buteo*, *Circus*.

M. Lesson, in common with other zoologists, separates his first order, the *Birds of Prey*, *Accipitres*, or *Rapaces*, into the diurnal and nocturnal. The first embraces three families:—1st, The Vultures; 2nd, The Falcons, or *Falconidæ*, which he subdivides into the *Noble Birds of Prey*, viz. the genera *Falco*, *Hiero-Falco*, *Physeta*, and *Gampsonyx*; and the *Ignoble Birds of Prey*, viz. the genera *Aquila*, *Haliæetus*, *Pandion*, *Circaëtus*, *Caracara*, *Harpya*, *Morphnus*, *Cymindis*, *Astur*, *Nisus*, *Milvus*, *Ictinia*, *Elanus*, *Nauclerus*, *Pernis*, *Buteo*, *Circus*. 3rd, The *Messagers*, or *Serpentarii*, consisting of one genus only, *Serpentarius*, the Secretary Falcon.

Mr. Swainson (*Fauna Boreali-Americana*) remarks that in contemplating the *diurnal birds of prey*, arranged by Linnæus under the genus *Falco*, we can be at no loss to discover the two typical forms in the *Toothed-billed Falcons* and the *Sparrow-hawks*. Their peculiarities, he adds, did not escape the notice even of the earliest systematic writers, and the moderns, he observes, have only confirmed the justness of the distinction. But with regard to the remaining groups, he states that much diversity of opinion still exists; not, indeed, as regards the leading divisions, for here likewise the antients had long ago anticipated our distinctions between the *Eagles*, *Kites*, and *Buzzards*. It is not, therefore, to these groups, taken *per se*, that any doubts can attach on their respective peculiarities, but rather as to their relative rank with those that are considered typical. These doubts, in Mr. Swainson's opinion, can only be solved by analysis; and from an attentive consideration of the difficulties arising from the want of materials in our museums, and other causes, he has been induced to dissent from several modern writers upon this family. He admits that it has been sufficiently proved that the various forms of which it is composed exhibit, as a whole, a circular succession of affinities; but the true series of the secondary groups, among themselves, has not, he asserts, yet been made out: he adds however, that the inability to state in what way the falcons or hawks form their own respective circles cannot militate against the belief that such is their true distribution. 'It remains, therefore,' continues Mr. Swainson, 'to be considered whether there is presumptive evidence to believe that the three remaining divisions, namely the *Buzzards*, *Kites*, and *Eagles*, form one circular group, independent of their affinity to the two former. The true *Buzzards*, of which the *Vulgaris* and the *Lagopus* may probably be types, are slender long-winged birds; the bill is small, short, and considerably curved: in this structure they agree with the true falcons, yet they are well known to be distinguished from them by wanting the toothed-bill, and by the shortness and graduated abbreviation of the exterior quill-feathers. Now, if Nature had proceeded in a simple course from the buzzards to the falcons, we should have had birds uniting the distinctions of both variously modified. Both these groups being composed, in their typical examples, of slender long-winged birds, with short bills, any species exhibiting the reverse of such characters, and intervening between the two forms, would certainly appear anomalous, on the supposition of a simple series of affinities being aimed at. Yet, that such birds are to be found, even among the few that we are subsequently to notice, is unquestionable. Let us then take the *Buteo borealis*, which, as being more allied to the falcons than to the kites, may be considered an intervening

form between tne *Buteo vulgaris* and *Falco*. We here see a large-sized, heavy bird with shortened wings, not reaching to more than half the length of the tail; while the elongated bill, unlike either that of *Buteo* or *Falco*, obviously assimilates to that lengthened form which belongs to the eagles. Now, upon the supposition that a bird so constructed is intended to fill up the interval between *Buteo* and *Falco*, and at the same time to unite the former with the *Eagles*, the singularity of its structure is no longer surprising: but if we consider it with a simple reference to the passage between *Buteo* and *Falco*, we are almost tempted to suspect that, in this instance, a real *saltus* has been made. While upon this subject we may cite an acute observation made by Prince C. Bonaparte, that 'the *Borealis* is almost as much an *Astur* of the first section as a *Buteo*;' a proof, at least, that its affinities to *Astur* and to the aberrant eagles adjoining that group have not escaped observation. Our idea that the buzzards are truly united to the eagles is still further strengthened by the *Buteo pterocles*, Temm. * * *. In this species the wings, as in *Buteo*, are remarkably long, but the bill is so considerably lengthened, that were we to judge alone from this member, we should have no scruple in placing the bird among the *Aquilæ*. On the other hand, it must be remembered that, as every group, from the highest to the lowest denomination, when perfect, contains a representation of the other four, united to a form peculiar to itself, so we might naturally expect that one division of the buzzards would represent the true eagles. To ascertain, therefore, whether the resemblances above stated are those of analogy or of real affinity, recourse must be had to strict analysis. Now this, in our present state of knowledge, cannot be done, at least from the resources to be found in this country. We have thought it advisable to cite the above facts, drawn from the structure of the birds themselves, as likely to awaken the attention of ornithologists to a further investigation of the subject; they will, at least, show that our opinion on the unity of the three aberrant groups is not entirely without foundation. Mr. Swainson considers the relative value of the whole group equivalent to that of *Vultur* or *Strix* in its own order, and to the families composing the *Rasores*, *Grallatores*, and *Natatores*, and he contemplates the five principal divisions as *genera*, arranging the subordinate forms as *sub-genera*; but in considering the five forms of the *Falconidæ* as genera, rather than sub-families, he guards himself against the supposition that he may mean to insinuate that the minor distinctions which have been dwelt upon by several able ornithologists who have investigated this family, are either trivial, or that they deserve not to be brought immediately before us. On the contrary he recommends to others the plan adopted by himself, viz. the minute examination of every change of structure, and the assembling together in minor groups such species as agree in certain peculiarities. Further, he would proceed, in certain cases, even to impose a name upon such groups. but in a family already so crowded by generic names he considers it essential to preserve a distinction between groups of unequal value; and not to elevate sub-genera, or forms of transition, to a rank they do not hold. *Milvago*, *Polyborus*, *Daptrius*, and *Ibycter*, are, unquestionably, in his opinion, of the latter description, each confined but to one species, and he says that he has another of the same natural group in his cabinet, equally deserving a patronymic name. By regarding these as genera, each, as he thinks, is made equivalent to the whole genus of typical falcons; whereas, by representing them as lesser variations, which he considers them in truth to be, the student immediately perceives that their station is subordinate.

The genera into which Mr. Swainson divides the *Falconidæ* are *Falco*, *Accipiter*, *Buteo*, *Cymindis*, and *Aquila*; and he gives the following table as the concentration of his remarks in reference to the sub-genera of *Falco*:*

Sub-genera of Falco.		Genera of the Falconidæ.
	1. Typical group.	
Falco.	Pre-eminently typical; bill acutely toothed; wings pointed, rather long.	Falco.
	2. Sub-typical group.	
Harpagus.	Wings shorter, rounded; tarsi with entire transverse scales.	Accipiter.
	3. Aberrant group.	
Lophotes.	Feet short; head crested.	Aquila.
Aviceda.	Feet small, very short; soles broad and flattened; outer toe and claw shortest.	Cymindis.
Gampsonyx.	Bill neither notched or (nor) festooned; head small; feet strong.	Buteo.

* Natural History and Classification of Birds. London, 1836.

By throwing each of these columns into their respective circles, and then bringing them into juxtaposition (which he does in the work quoted) the same results, he remarks, will follow. Into the accipitrine circle he admits *Ictinia*, provisionally, *Accipiter* (type), *Astur* (Goshawks), *Haliæetus* (*H. Pondicerianus*), and no more. In the Aquiline circle he retains four 'types,' viz. *Pandion*, *Harpyia*, *Aquila*, and *Ibycter*. In the Cymindian or Milvine circle he places *Polyborus*, *Cymindis*, *Elanus*, *Nauclerus*, and *Circetus*, the last with a query, and in the cut of the circle it is not mentioned. In the Buteonine circle *Milvus*, *Circus*, and *Buteo*.

Mr. Vigors who, as we have seen, first proposed the application of the Quinary System to the *Falconidæ*, and indeed to the birds in general, thus defines the family which is the subject of our inquiry, and thus follows out his arrangement.

Falconidæ. (Leach.)

Head plumose. *Beak* strong, hooked, with a cere at the base. *Nostrils* lateral, more or less rounded, open and situated in the cere. External *toes* especially connected with the middle toes. *Claws* or *nails* strong, very sharp, very much incurved, and retractile:*

1st. Sub-family, *Aquilina*.

Beak long, hooked at the apex only. Fourth quill the longest.

*

Long-winged Eagles.

Genera. Ibycter. (Vieillot.)

Beak convex above. Lower *mandible* notched at the apex, and subacute. *Cere* naked. *Cheeks*, *throat* (gula) and *crop* (jugulum) featherless. *Claws* acute.

Mr. Vigors remarks that the type of this genus is *Falco aquilinus* of Gmelin, *Petit Aigle d'Amerique* of Buffon, and that he believes it still stands single in the genus.

Description. *Beak* cærulean; *cere* and *feet* yellow; *orbits* yellow; *irides* orange; *body*, above, cærulean; below, red going into white; *neck* purplish to rufous; *claws* black. Gmelin gives it as the *Red-throated Falcon* of Latham.

Locality, South America.



Head and Foot of Ibycter Aquilinus.

* The characters of the sub-families and genera are from those given by Mr. Vigors.

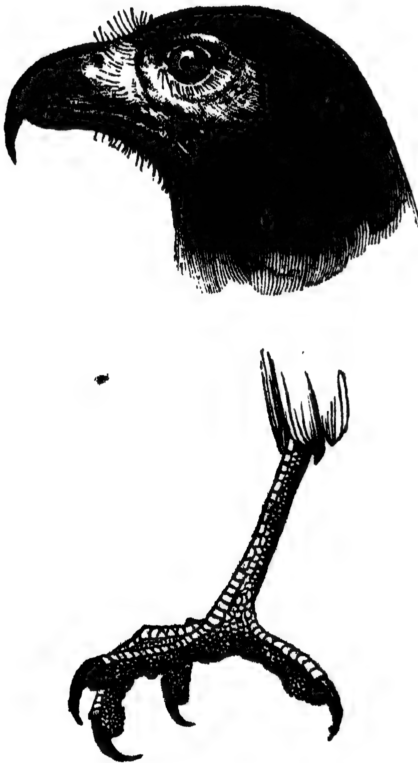
Daptrius. (Vieillot.)

Beak convex above. Lower *mandible* angular beneath, notched at the apex, obtuse. *Cere* with scattered hairs. *Orbits, throat*, and *crop*, featherless. *Claws* acute.

'How far,' writes Mr. Vigors, 'the two preceding genera of M. Vieillot are sufficiently distinct from each other, or from the remainder of the naked-cheeked *Eagles*, it is not for me to hazard an opinion, without the opportunity of more accurate examination of the birds than is at present within our power, and a more accurate knowledge of them than a mere description affords us. It would appear, however, that one group at least, that of *Ibycter*, is sufficiently distinguished from the other *Falconidæ* with the naked cheeks, by the difference of its food and habits. The accounts which have reached Europe of its mild and gentle manners and vegetable food have even induced some naturalists to refer it to the Gallinaceous Birds. I have strong doubts indeed whether the birds that compose this genus may not belong to quite a distinct station from the present, and be referrible to one of those groups which I have elsewhere observed to be wanting among the Birds of Prey, to perfect that chain of affinities which is to be found complete in all the other orders. It is impossible, however, at present, to come to any decision on the subject. While our materials for classification are so scanty, the most that is in our power is to conjecture the place which more perfect information will enable us to assign any group hereafter. For the present we may leave the genus before us in that situation, between the *Vulturidæ* and the *Falconidæ*, which they have hitherto been generally supposed to fill.'

Example, *Daptrius ater*.

Description.—Black with bluish reflections; *tail* white at its base above, and rounded; *beak* and *claws* black; *cere* blackish ash, space round the eyes naked and of a flesh-colour; *feet* yellow. Length from 14 to 15 inches French. This is the *Iribin noir* of Vieillot, and the *Caracara noir, Falco aterrimus*, of Temminck. *Locality*, Brazil and Guiana. M. Lesson notes it as probably a genus for suppression



Head and Foot of Daptrius Ater.

Polyborus. (Vieillot.)

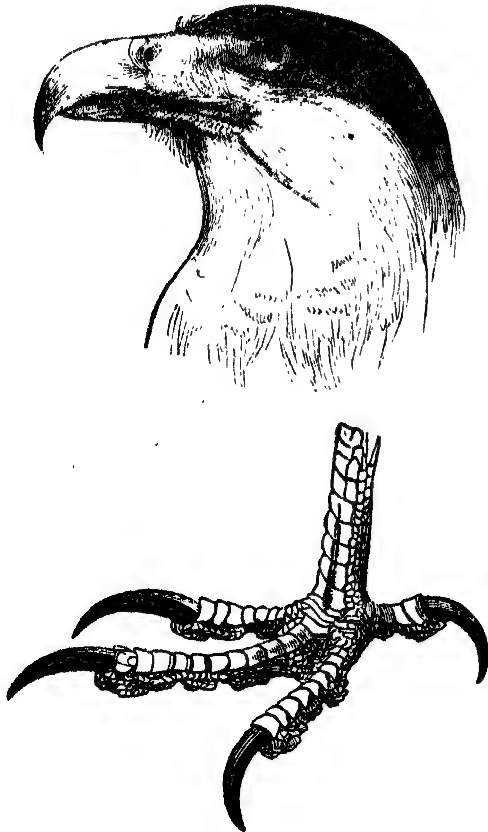
Beak compressed above. Lower *mandible* entire and obtuse; *cere* covered with hairs, large; *cheeks* and *throat* featherless; *crop* woolly. Example, *Polyborus Brasiliensis*, *Polyborus vulgaris*. Vieillot. The *Brazilian Caracara Eagle*.

We select Mr. Bennett's *Description* and general history of this species as the most complete. After giving the generic characters, and observing that the wings nearly equal the tail in length, that they are of a rounded form with the third and fourth quills longest; that the legs are rather long, naked, and reticulated, and the claws of moderate length and curvature, but with little acuteness or power of grasping, the last-named author thus proceeds:—'In the Brazilian Caracara the whole upper surface of the head is black, with the feathers slightly elongated backwards, and capable of being partially elevated in the shape of a pointed crest. The entire neck is of a light brownish gray, which also forms the ground colour on the breast and shoulders, but with the addition on these parts of numerous transverse wavy bars of a deeper brown. Nearly all the rest of the plumage is of a tolerably uniform shade of blackish brown, with the exception of the tail, which is at the base of a dirty white, with numerous narrow, transverse, undulated bands of a dusky hue, and, in its terminal third, black without any appearance of banding. The beak is horn-coloured at the tip and bluish at the base; the iris hazel; the cere and naked cheeks of a dull red; the legs yellow, and the claws black. Such at least are the colours of the living specimen in the Society's garden. Several changes, however, take place in the plumage of the bird as it advances in age, and these are well illustrated by an extensive series of specimens in the Museum in Bruton-street,'—now in Leicester Square. 'So great in fact is the variation of colours in this species that scarcely any two descriptions of it correspond throughout, and the figures by which it has been illustrated differ from each other even more remarkably than the descriptions by which they are accompanied.' (*The Gardens and Menagerie of the Zoological Society delineated*, vol. ii.)

The same author observes that Marcgrave was the first to introduce into Europe the name of Caracara, the vulgar appellation of the bird in Brazil, derived from its hoarse and peculiar cry. But although M. Cuvier regards Marcgrave's Caracara as identical with the species described by Mr. Bennett, the latter remarks that both the figure and description are so much at variance with it that he feels himself compelled to adopt in preference the opinion of Professor Lichtenstein, founded upon the original drawing, that they belong to a totally different bird. Mr. Bennett is consequently unable to trace the history of the true Caracara beyond the year 1784, when a figure and description were published at Vienna by the younger Jacquin, from his father's papers, under the name of *Falco cheriway*. These Mr. Bennett has no hesitation in referring to the present species. The principal differences between them consist, he states, in the markings on the breast and neck, which in the figure are more longitudinal than transverse; and in the very awkward foreshortening of the beak, which completely distorts its natural form. The former appears, from the specimens in the Society's Museum, to be one of the distinctive marks of the young bird. Cuvier, in the last edition of the *Règne Animal*, observes that the *Falco cheriway* of Jacquin may be nothing but a variety of age. Mr. Bennett then notices the very complete description of the adult Caracara in D'Azara. According to this author, the full-grown bird measures 21½ inches in length and 50 in the expanse of the wings. Its colours agree with the description above given, excepting that the first six quill-feathers of the wings are white, marked with rays and spots of brown, and become blackish towards the point; the back is transversely rayed with brown and white, the latter predominating on its upper half, and *vice versâ*; the fore part of the neck and breast are traversed by dusky lines mixed with a larger proportion of white; the cere is of an orange hue; and the throat and sides of the head are almost white. This description, Mr. Bennett remarks, very nearly coincides with that of M. Cuvier, taken from specimens in the Paris Museum, and with the figure of one of these specimens given by M. Vieillot in his 'Galerie des Oiseaux;' and Mr. Bennett then refers to the figure given by M. Spix in his 'Birds of Brazil,' as the young of this species, which resembles M. Vieillot's in its form, except that the legs are longer and thicker, and the tips of the wings reach to the extremity of the tail. In colour it is rather of a darker brown, approaching more nearly to the Society's specimen alluded to by Mr. Bennett; the throat is light brown instead

of white; and the transverse waves of the breast and shoulders are replaced by longitudinal brown dashes upon a light ground. The cere and naked cheeks are in both of a bright yellow; indeed Mr. Bennett states that he has nowhere met with them of the same hue with those of the Society's living specimen, except in the figure and description of Jacquin.

Habits, Food, Reproduction. The *Caracara* is said to live either alone or in pairs. But D'Azara states that he has seen them join in companies of four or five to hunt down prey which a single caracara would find a difficulty in mastering, such as red buzzards, herons, and other large birds, and it is believed that they will even destroy the American ostrich, young fawns, and lambs, when so associated. In its *food* it seems to be content with any animal substance. Carrion (for if a caracara see a vulture devour a piece of flesh he is said to pursue him and compel him to disgorge it), toads, frogs, worms, snails, lizards, grubs, grasshoppers, winged ants, snakes, and flies, birds—in short the general prey of buzzards, hawks, falcons, and insectivorous birds,—all suit its appetite. Two of the specimens obtained by M. Spix were shot in the act of extracting insects from the hides of oxen. D'Azara will not allow that the caracara preys on the smaller birds, because, he says, that it is unable to catch them; but Prince Maximilian found in the stomachs of those which he opened the remains of small birds and insects, especially grasshoppers, which abound in its haunts. It is by no means shy, and advances like the vultures to inhabited places, perching on trees and housetops and not caring to conceal itself. It is seldom attacked, for it rarely molests domestic poultry, but it is stated that it will sometimes carry off the sportsman's game. The *nest*, according to D'Azara, is built on the tops of trees, especially those round which the climbing plants are most luxuriant, or in a bushy thicket. It is large, and composed of sticks and twining branches laid nearly flat, and lined, inartificially, thickly with hairs. The eggs, which are laid in August, September, or October, are two in number, pointed at one end, and dotted and blotched with crimson on a brownish-red ground.



Head and foot of Polyborus Brasiliensis.

Locality. The bird extends over a considerable part of South America; the island of Aruba, on the coast of Venesuela (Jacquin); Brazil and Paraguay (Cuvier); most abundant in the south and east of Brazil (Prince of Neuwied); Spix's specimens were from the northern provinces; less numerous on the Rio de la Plata than in Paraguay, where it is almost equal in number to all the other birds of prey put together (D'Azara); Straits of Magalhaens (Capt. Phillip Parker King, R.N.).

N.B.—There are now (1837) two fine specimens in the garden of the Zoological Society in the Regent's Park.

Mr. Bennett's provisional species *Polyborus* (?) (*hypoleucus*) was founded on the *Angola Vulture* of Pennant, *Vultur Angolensis* of Gmelin, in an immature state of plumage.

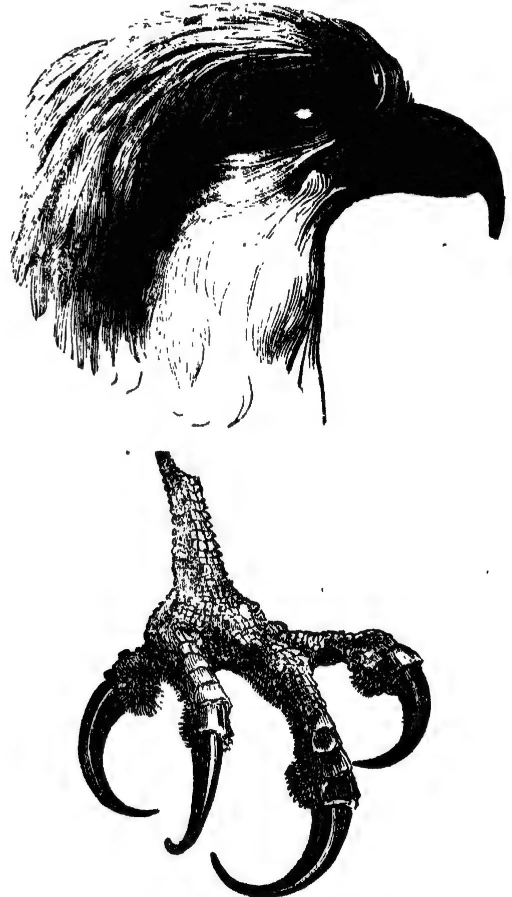
Dr. Smith proposed the genus *Polyboroïdes* on the *Falco Gymnogenys* of Temminck in the South African Journal, in April, 1830, and M. Lesson, in the November of that year, separated the same form under the generic title *Gymnogenys*.

From *Ibycter* and *Polyborus* Mr. Vigors passes to the *Fishing Eagles*, and particularizes as the first

Pandion (Savigny).

Beak rounded above. *Cere* hispid. *Nostrils* lunulated and membranaceous on the upper margin. *Tarsi* naked. *Acrotarsia* covered with rigid, reticulated scales. *Toes* free, the external toes versatile. *Claws* equal, rounded underneath. 2d. *quill* longest.

Example, *Pandion Haliætus.*



Head and foot of Pandion Haliætus.

Mr. Vigors is of opinion that this group presents us with a decidedly characteristic difference from all the other species of the family, except those of *Elanus*, in the internal parts of the nails being rounded instead of grooved. The *culmen* of the bill, he observes, is also more broad than usual and much rounded; the toes are entirely separated, and the tarsi are covered with strong, prominent, and thickly reticulated scales. The same author remarks that the well-known *Osprey* of our coasts, *Falco Haliætus* of Linnæus, is the type of the genus to which the valuable researches of Dr. Horsfield in Java have added a second species, *P. Ichthyætus*. In this species, however, which agrees with *Pandion* in the more essential characters, Mr. Vigors finds a strong approximation to the following genus, *Haliæetus*.

Its bill, he adds, is more compressed than that of *Pandion*, its *acrotarsia* are scutellated, and the 4th quill feather, as in *Haliæetus*, is the longest. It thus stands, in the opinion of Mr. Vigors, osculant between the two groups. For the description and natural history of Pandion Haliætus see BALD BUZZARD, vol. iii. p. 316.

The last group of the *Fishing Eagles*, according to Mr. Vigors, is comprised in the genus

Haliæetus (Savigny).

Beak convex above. *Nostrils* lunulated, transverse. *Cere* sub hispid. *Tarsi* semiplumed. *Acrotarsia* scutellated. *Toes* free, the external toe versatile. *Claws* unequal.

Mr. Vigors notices the difference of this form from *Pandion* in the structure of the nails and the more compressed culmen of the bill; in the *tarsi*, also, which have the acrotarsia scutellated and are feathered half way below the knee. There are several species; for instance, *F. leucocephalus*, *F. albicilla*, *F. Pondicerianus*, *F. blagrus*, *F. vocifer*, &c., &c.

Example, *Haliæetus leucocephalus*.

Before we proceed to the description of our example, it may be necessary with Mr. Bennett's assistance to clear up the confusion which, as he observes, has existed in the synonymy of *Haliæetus albicilla*, the difference of the colours of the plumage in the various stages of its growth having induced authors to record it under several distinct names. Three of these were almost universally admitted till about 26 years ago, when the result of M. F. Cuvier's observations on the individuals kept in the Jardin des Plantes led him to unite *Falco ossifragus*, *albicaudus*, and *albicilla* of Gmelin under one name: subsequent inquiry has confirmed this conclusion. In the earlier stages of life the beak of *H. albicilla* is of a bluish horn-colour; its head and neck deep brown; the plumage above, brownish-black mixed with whitish or ash-coloured spots on the back and tail. In this state it is *Falco ossifragus* of systematists. About the third or fourth year the head and neck become ashy-brown; the beak gradually changes from bluish to pale-yellow, the white spots on the back vanish, and the tail becomes uniformly grayish-white. It is now *Falco albicaudus* of Gmelin, *Petit Pygargue* of Buffon, and the *Lesser White-tailed Eagle* of Latham. In its fifth year it is come to maturity, and the change is complete. The head and neck have little of the brown tinge left, the back is throughout of a dusky-brown intermingled with ashy-gray, and the tail is quite white. In this its perfect state it is *Falco albicilla*, the *Grande Pygargue*, the *White-tailed* or *Cinereous Eagle*. In all the stages of this, *The Great Sea Eagle*, which inhabits nearly the whole of Europe and of Northern Asia, the cere and naked parts of the legs are yellow; the under part of the body is of a lighter hue than the upper, and more thickly interspersed with pale cinereous spots; the claws are completely black. (*Gardens and Menagerie of the Zool. Soc. delineated*, vol. ii.)

We now return to *Haliæetus leucocephalus*, the *Sea Eagle*, *Bald Eagle*, *White-headed Eagle*, the symbol of the United States of America.

Mr. Bennett, in the work last quoted, remarks, that in the earlier stages of its growth there is little to distinguish this species from the *Great Sea Eagle*. M. Vieillot, indeed, following the example of Daudin, has united the *White-headed Eagle* to the list of synonyms of the *Great Sea Eagle*. 'That such a union, writes Mr. Bennett, 'is founded upon insufficient data is proved by the gradual development in the bird under consideration of a character which, after a certain age, at once distinguishes it from the remainder of its tribe. This character consists in the pure whiteness of its head and neck, from whence it has derived the popular but inappropriate title of the *Bald Eagle*, by which it is most commonly known.' The young are clothed at first with a thick whitish or cream-coloured cotton-like down, and they become gradually gray as the development of the true plumage goes on. In the third year the white may be traced upon the head, neck, tail-coverts, and tail; and by the end of the fourth year these parts become completely white, or sometimes tinged slightly with cream-colour. The eye, which is at first hazel, changes to a brilliant straw-colour as the head whitens (Wilson). 'This account of the metamorphoses in colour of the white-headed sea eagle,' says Mr. Bennett, 'derived from the personal observations of the accurate author of the *American Ornithology*, has been in a great measure verified under our own inspection in the specimen now before us, which remained for several years in the possession of Mr. Brookes, before it was presented by him to the Society.

'During a considerable part of the time it was regarded as the *Common Sea Eagle*; and it was not until its gradual change of plumage had at length rendered obvious its true character, that it was ascertained to be in reality a distinct species. The same error appears frequently to have existed with regard to it; and M. Temminck observes that the only mark of distinction that can be traced in it until it has assumed the adult colouring, consists in the somewhat greater length of its tail. He might however have added its smaller size, which is probably one-fourth less than that of the preceding bird, at the same age and under similar circumstances. From the observations which we have been enabled to make upon the subject, we should be led to conclude that the period in which it attains its full growth and perfect colouring is, in this country at least and in captivity, two or three years longer than that stated by Wilson. In its immature state, that is to say about the third year, the upper parts of the head and body exhibit a mixture of brown and dirty white, the separate feathers having a ground of the latter colour, and being deeply tipped and broadly barred along the centre with the former. The quill-feathers and primary wing-coverts are black, with their shafts of a pale brown; the secondary are considerably lighter; and the tail, which projects in a trifling degree beyond the extremities of the wings, is brown on the outer quills and of a mixed white and brown on the inner. The under surface, as far backwards as the middle of the belly, is of a much lighter shade than the upper, being of a dull white, with numerous broad streaks of pale brown. In the posterior part it is of a deep brown, the feathers being only slightly margined with white. A similar hue prevails on the upper parts of the legs, which are plumed somewhat below the knees. The beak is of a dusky brown; the cere and legs of a golden yellow; the iris somewhat lighter; and the talons deep blackish-brown. The latter are long, strongly curved, of considerable power, and extremely sharp at the points. The full-grown bird measures upwards of three feet in length from beak to tail, and more than seven in the expanse of its wings. Its beak is changed to a bright yellow; and its head, a greater or less proportion of the neck (according as the bird is more or less advanced in age), and the entire tail, are become perfectly white. An analogous change, as we have before seen, takes place in the plumage of the preceding species; but the head and neck of that bird always retain more or less of a brownish tinge, seldom changing fully into grey, and never turning completely white. These observations have been made upon numerous individuals, many of them placed for upwards of ten years under the eyes of various scientific observers: their accuracy may therefore be regarded as unquestionable. The remainder of the plumage in this state is of a deep brown, approaching to black, and strongly contrasted with the head and tail. The colour of the legs, feet, and talons remains nearly the same; but the iris generally continues to assume a lighter and a lighter hue. The eyes, it should be observed, are deeply sunk in the head, and instead of being placed in a line parallel with that of the cheeks, are directed forwards, so as to form with them a considerable angle.'

Habits, Food, Reproduction.—The reader will find in the article BALD BUZZARD an account of the robberies committed by the *Bald Eagle* on the latter: nor are its acts of plunder confined to that bird, for it will rob the vultures, and even, in hard times, make them disgorge their carrion to satiate its appetite. According to Audubon, it will strike down a swan and other aquatic birds, and now and then procure fish for itself by pursuing them in shallow creeks; it also devours young pigs, lambs, fawns, and putrid flesh of every description. Niagara is one of its favourite haunts, where it watches for the swollen carcasses that the cataract has precipitated down the falls. Wilson saw one seated on a dead horse, keeping a whole flock of vultures at a distance till it had satisfied itself; and, on another occasion, when many thousands of tree-squirrels had been drowned in their migration across the Ohio, and had collected hosts of vultures, the sudden appearance of a *Bald Eagle* sent them all off, and the eagle kept sole possession for many days.

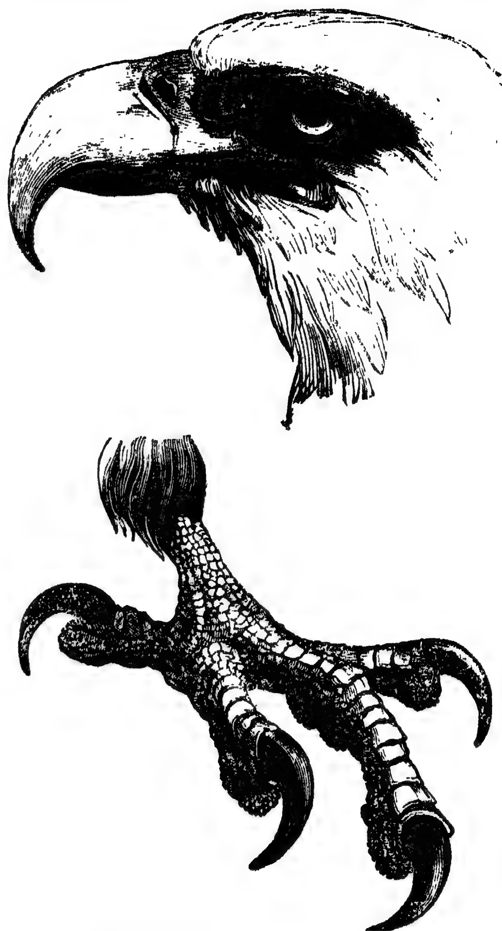
Benjamin Franklin thus speaks of this emblem of the United States of America:—'For my part, I wish the Bald

Eagle had not been chosen as the representative of our country. He is a bird of bad moral character; he does not get his living honestly. You may have seen him perched on some dead tree, where, too lazy to fish for himself, he watches the labours of the fishing-hawk; and when that diligent bird has at length taken a fish, and is bearing it to his nest for the support of his mate and young ones, the Bald Eagle pursues him and takes it from him. With all this injustice, he is never in good case, but, like those among men who live by sharping and robbing, he is generally poor, and often very lousy. Besides, he is a rank coward: the little King-Bird, not bigger than a sparrow, attacks him boldly, and drives him out of the district. He is therefore by no means a proper emblem for the brave and honest Cincinnati of America, who have driven all the *King Birds* from our country; though exactly fit for that order of knights which the French call *Chevaliers d'Industrie*.'

With regard to the *Reproduction*, M. Audubon says that incubation commences in the beginning of January. He shot a female on the 17th of that month, as she sat on her eggs, in which the chicks had made great progress. 'The nest,' says that author, 'which in some instances is of great size, is usually placed on a very tall tree, destitute of branches to a considerable height, but by no means always a dead one. It is never seen on rocks. It is composed of sticks from three to five feet in length, large pieces of turf, rank weeds, and Spanish moss in abundance, whenever that substance happens to be near. When finished, it measures from five to six feet in diameter, and so great is the accumulation of materials, that it sometimes measures the same in depth, it being occupied for a great number of years in succession, and receiving some augmentation each season. When placed in a naked tree, between the forks of the branches, it is conspicuously seen at a great distance. The eggs, which are from two to four, more commonly two or three, are of a dull white colour, and equally rounded at both ends, some of them being occasionally granulated. Incubation lasts for more than three weeks, but I have not been able to ascertain its precise duration, as I have observed the female on different occasions sit for a few days in the nest before laying the first egg. Of this I assured myself by climbing to the nest every day in succession, during her temporary absence.' (*Ornithological Biography*, vol i.)

Locality.—In every part of the United States of America, seldom appearing, according to Audubon, in very mountainous districts, but preferring the low lands of the sea-shores, those of the larger lakes, and the borders of rivers. Mr. Bennett remarks, that the *White-headed Eagle* is usually spoken of as inhabiting the northern parts both of the old and new continent; but that it appears to be only a rare and occasional visitant of the former. It is probable, he adds, that some of the varieties of the *Common Sea-Eagle* of this quarter of the globe have been frequently mistaken for it, and remarks, that throughout nearly the whole of North America, on the contrary, where the European species seems to be unknown, it is met with in great abundance. Dr. Richardson says that it is the earliest of the summer visitors to the fur countries, and the period of its arrival has given the name of *Meekeeshew espeeshim*, or Eagle Moon, to the month of March. 'Temminck,' says Dr. Richardson (*Fauna Boreali-Americana*), 'assigns for its habitual residence the regions within the Arctic Circle; and Wilson observes, that it is found at all seasons in the countries it inhabits. Both these assertions however require, I apprehend, to be taken with considerable latitude. We did not, on the late expeditions, meet with it to the north of the Great Slave Lake (62° N. lat.), although it is common in the summer, in the country extending from thence to Lake Superior, and its breeding-places in the latter district are numerous. But in the month of October, when the rivers from which it draws its principal supply of food are frozen over, it entirely quits the Hudson's Bay lands; and if, after that period, it is to be seen in the northern regions, it can only be on the sea-coast, and for a limited time, while the sea continues unfrozen. . . . It is known to breed as far south as Virginia, but its nests do not appear to be so common within any part of the United States as they are in the fur countries.' The bird is not mentioned in the Supplement to Captain (now Sir W. E.) Parry's First Voyage, nor in that to Captain (now Sir John) Ross's Last Voyage.

This bird is the *Meekeeshew* (name for the species), *Wapustiquan-Meekeeshew* (White-headed Eagle—mature bird), *Appisk-Meekeeshew* (Black-headed Eagle—immature bird), and *Meekeeseeseesh* (Yearling birds) of the Cree Indians.



Head and foot of Haliæetus leucocephalus.

Colonel Sykes notes among the birds of Dukhun (Deccan) *Haliæetus Ponticerianus*, *Falco Ponticerianus* of Latham, *Brahminy Kite* of the Europeans in India. The Colonel says that it is seen constantly passing up and down rivers at a considerable height, but prepared to fall at an instant on its prey. Usually it seizes while on the wing, but occasionally dips entirely under water, appearing to rise again with difficulty. It is quite a mistake, he adds, to suppose it feeds on carrion. On the examination of the stomach and craw of many specimens, the contents were found to be fish, and fish only, excepting on one occasion, when a crab was met with. (*Zool. Proc.*, April, 1832.)

There is a beautiful specimen of *Haliæetus Aguia*, *Chilian Sea-eagle*, now (1837) in the gardens of the Zoological Society, in the Regent's Park; and there is a specimen of *Haliæetus vocifer*, the *Fishing Eagle* of the Cape colonists, in the South African Museum, now (1837) exhibiting in the Egyptian Hall, Piccadilly. The last bird is only met with in the neighbourhood of the sea, or upon the banks of large rivers. See the interesting Catalogue, where it is also stated that *Aquila vulturina*, also in the Museum, resorts exclusively to high rugged mountains, where it preys upon the *Hyrax Capensis*—the *Dassie* of the Cape colonists. Dr. Smith (*Zool. Proc.*, April, 1833) had previously stated that *Aquila Verrauxii* of Lesson is synonymous with *Aquila vulturina*, which had recently been described by M. Lesson as a *Haliæetus*, but that it has however none of the habits of the *Fishing Eagles*, inhabiting the highest and most rocky mountains, preying principally upon the animal mentioned in the Catalogue. In the 'Proceedings' it is added that the error probably arose from the white back being concealed, in stuffed specimens, by the wings.

Leaving the *Fishing Eagles*, Mr. Vigors proceeds to

Circæetus. (Vieillot.)

Beak convex above. *Nostrils* lunulate, transverse *Cere* subhispid. *Tarsi* elongated, naked. *Acrotarsia* re-

ticulated. *Toes* short, the external toe connected with the middle one at the base. *Claws* short, subequal. This genus is founded upon the well-known *Jean le Blanc* of the European continent, *Falco brachydactylus* of Wolff, *Falco Gallicus* of Gmelin, *Aquilotto* of the Italians. Here, Mr. Vigors observes, we find the exterior toe united to the middle by a short membrane, which is the case indeed in the greater portion of the family, while in the two latter genera the toes are all divided to the origin.

Description.—Circaëtus brachydactylus is, according to Temminck, the *Falco brachydactylus* of Wolff; *Aquila brachydactyla* of Meyer; *Falco Gallicus* of Gmelin; *Falco leucopsis* of Bechstein; *Aquila leucamphoma, Borkh. Deut. Orn.; Le Jean le Blanc* of Buffon and the French generally; *Aigle Jean le Blanc* of Temminck; *Falco Terzo d' Aquila*, Stor. deg. Ucc.; and *Kurzzehiger-Adler* of Meyer.

Old Male.—Head very large; below the eyes a space clothed with white down; summit of the head, cheeks, throat, breast, and belly, white, but variegated with a few spots of bright brown; *back* and *coverts* of the wings brown, but the origin of all the feathers of a pure white; *tail* square, gray-brown, barred with deeper brown, white below; *tarsi* long and grayish-blue, as are the *toes; beak* black; *cere* bluish; *iris* yellow; length, two feet.

Female.—Less white than the male. The *head*, the *neck*, the *breast*, and the *belly*, are marked with numerous brown spots, which are very much approximated.

Young.—Upper parts darker, but the origin of the feathers pure white; *throat, breast*, and *belly*, of a red-brown, little or not at all spotted with white; bands on the *tail* nearly imperceptible; *beak* bluish; *feet* greyish-white.

Food and *Reproduction.*—Lizards and serpents, to which it gives the preference; rarely birds and domestic poultry. The *nest* is built on the highest trees, and the eggs are two or three in number, of a lustrous grey, and spotless.



Head and foot of Circaëtus brachydactylus.

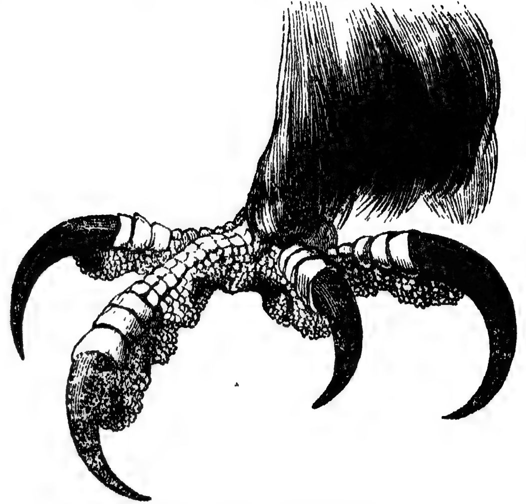
Locality.—The great fir forests of the eastern parts of the north of Europe; not common in Germany and Switserland; rare in France; never seen in Holland. (Temminck.) Prince Bonaparte notes it as rather rare near Rome. Colonel Sykes notes it among the birds of the Dukhun (Deccan)

Dr. Smith's *Circaëtus pectoralis*, which undergoes many changes of plumage before it arrives at maturity (see South African Museum and Catalogue), is stated (*Zool. Proc.*, April, 1833) to be synonymous with *Circ. thoracinus* of Cuvier.

Mr. Vigors next proceeds to the true

Aquila (of Authors).

Beak subangular above. *Nostrils* rounded. *Cere* subhispid. *Tarsi* plumed to the toes.



Leg and foot of Golden Eagle.

Mr. Vigors observes that the predominant mark of distinction in this genus is the *tarsi* being feathered to the toes. The *culmen* of the bill appears also to differ from that of the other *eagles* in being more angular. The species *Aquila heliaca* of Savigny, *Falco chrysaetos*, and *Falco nævius* of Linnæus, *Falco bellicosus* of Daudin, with some others lately made known to us, belong to the group which contains the most powerful birds of the family.

Example, *Aquila chrysaetos, the Golden Eagle, Adler* of the Germans, *Eryr Melyn* of the antient British.



Aquila chrysaetos

Description.—*Old birds.*—Summit of the *head* and nape with acuminated feathers of a lively and golden-red; all the other parts of the *body* obscure brown, more or less blackish according to the age of the individual; inside of the *thighs* and feathers of the *tarsus* clear brown; *never any white feathers among the scapulars;* tail deep grey, barred with tolerable regularity with blackish-brown, and terminated at the end by a large band of that colour; *beak* horn-colour; *iris* always brown; *cere* and *feet* yellow. In this state Temminck considers it to be the *Aquila fulva* of Meyer; *Falco niger* of Gmelin; *Falco fulvus* and *Falco Canadensis* of Gmelin; *Falco chrysaetos* of Linnæus; *L'Aigle Royal* of Buffon; *Le Grand Aigle*, Gerard, *Tab. Elem.; L'Aigle Commun* and *L'Aigle Royal* of Cuvier; *Ringtail* and *Golden Eagle* of Latham; and *Aquila Reale di Color leonato* and *Aquila Rapace*, Stor. deg. Ucc.

Young birds of one and two years. (Ring-tail Eagle.) All the plumage of a ferruginous or clear reddish-brown, uniform on all parts of the *body:* lower *tail coverts* whitish; inside of the *thighs* and feathers of the *tarsus* of a pure white; *tail* quite white from the base to three-fourths of its length, but afterwards brown to the end; internal barbs of the *quills* and of the *caudal feathers* pure white: this same colour occupies also the greatest part of all the feathers of the body from their base. In proportion as the young bird advances in age the colours of the plumage become brown, the white of the tail occupies less space, and traces of the transverse bars appear. In the third year the young bird puts on his adult plumage.

Varieties.—Partially or totally white. (*Falco albus* of Gmelin; *Falco cygneus* of Latham; *L'Aigle Blanc* of Brisson.)

Food and *Reproduction.*—The Golden Eagle preys on lambs, fawns, &c., and often on large birds. Extreme hunger will drive it to prey on carcasses.

Locality.—The great forests in plains, and in a less degree those in the mountains of the north of Europe; very common in Sweden, in Scotland, in the Tyrol, Franconia, and Suabia; more rare in Italy and Switzerland; rather common in France, in the forest of Fontainebleau, in the mountains of Auvergne, and on the Pyrenees; rare in Holland; less common in the Oriental countries than the preceding species, *i.e. Aquila heliaca* of Savigny, *Aquila imperialis* of Temminck. (Temminck.) According to Wilson, the Golden Eagle inhabits America, and occurs from the temperate to the arctic regions, particularly in the latter, where it *breeds* on precipitous rocks, always preferring a mountainous country. Dr. Richardson (*Fauna Boreali-Americana*) mentions it with a query as breeding in the recesses of the sub-alpine country which skirts the Rocky Mountains, and as seldom seen farther to the eastward. 'It is,' says Dr. Richardson, 'held by the aborigines of America, as it is by almost every other people, to be an emblem of might and courage, and the young Indian warrior glories in his eagle plume as the most honourable ornament with which he can adorn himself. Its feathers are attached to the calumets, or smoking pipes, used by the Indians in the celebration of their solemn festivals, which has obtained for it the name of the Calumet Eagle. Indeed, so highly are these ornaments prized, that a warrior will often exchange a valuable horse for the tail feathers of a single eagle.' It is the *Keoo* of the Cree Indians. Dr. Richardson observes that the mature British Golden Eagle has a darkish-brown tail and wings, blackish-brown back, clouded with brownish-black, and a paler and brighter-brown head. He had not seen an American one in this state, but we do not think that any reason for a doubt. Many other authors mention the eagle and ring-tails in such terms as to leave the identity of the bird almost unquestionable; and though Dr. Richardson says that it is seldom seen farther to the eastward than the Rocky Mountains, M. Audubon relates that he saw a Golden Eagle on the coast of Labrador, besides others in various parts of the United States. It inhabits Russia, Iceland, and Germany, and is said to occur in Northern Africa and Asia Minor. Mr. Yarrell, in his interesting History of British Birds, now in the course of publication, thus sums up its localities in our islands. 'The Golden Eagle, though occasionally seen, and sometimes obtained, in the southern counties of England, is more exclusively confined to Scotland, and its western and northern islands. Some years ago a specimen was killed at Bexhill, in Sussex it has also occurred, but very rarely, in Suffolk, Norfolk, Derbyshire, Durham, and Northumberland. Mr. Mudie, in his 'Feathered Tribes' of the British Islands,' has named 'the higher glens of the rivers that rise on the south-east of the Grampians, the high cliff called Wallace's Craig, on the northern side of Lochlee, and Craig Muskeldie on its south side,'' as localities for the Golden Eagle. Mr. Selby and his party of naturalists observed this species in Sutherlandshire in the summer of 1834. Mr. Macgillivray, in his detailed descriptions of the rapacious birds of Great Britain, has recorded his own observations of this species in the Hebrides; and other observers have seen it in the Orkney and Shetland Islands, where it is said constantly to rear its young. In a direction west of London the Golden Eagle has been obtained or seen on the coasts of Devonshire and Cornwall. In Ireland, a Ring-tailed Eagle (the young of the Golden) was seen by a party of naturalists in Connamara in the autumn of 1835; and from William Thompson, Esq., vice-president of the Natural History Society of Belfast, to whom I am indebted for a catalogue and notes of the birds of Ireland, which will be constantly referred to throughout the work, I learn that specimens of the Golden Eagle are preserved in Belfast which were obtained in the counties of Donegal and Antrim.' The age of the eagle is almost proverbial. One that died at Vienna is said to have lived in confinement 104 years. Colonel Sykes notes the Golden Eagle among the birds of the Dukhun (Deccan). His specimen differed so slightly from the European bird as not to justify its separation. (*Zool. Proc.*, April, 1832.)

In the catalogue of birds collected on the Ganges between Calcutta and Benares, and in the Vindhyian hills between the latter place and Gurrah Mundela, on the Nerbudda, by Major James Franklin, F.R.S., &c., we find recorded an eagle, *Aquila Vindhiana*, with a query whether it is the *Cawnpoor Eagle* of Latham (*Zool. Proc.*, August, 1831), and among the Dukhun birds, *Aquila bifasciata* of Hardwicke and Gray. (*Ind. Zool.*) A whole rat was found in the stomach of one bird. A second was shot by Colonel Sykes at the dead carcass of a royal tiger, but it had not fed, for the stomach was empty. Dr. Smith stated (*Zool. Proc.*, 1833) that the eagle from the Cape presented to the Society by the Hon. J. T. Leslie Melville, and in the Society's menagerie, was not the young of *Aquila vulturina* (Daudin), but of *Aquila Choka* (Smith), *Falco rapax* (Temminck). Specimens of *Aquila bellicosa* and *rapax* are in the South African Museum, as well as of *A. vulturina*. The first is only found in wooded districts, preys upon small quadrupeds, and has been known to pounce upon small antelopes, and carry them off entire to its nest. *A. rapax*, though it principally preys on living creatures, does not wholly reject carrion, being frequently one of the first birds that approaches a dead animal. (See Catalogue of South African Museum.) Mr. Keith Abbott (*Zool. Proc.*, June, 1834) notes among the Trebizond birds *Aquila pennata*, inhabiting Eastern Europe and the adjacent parts of Asia and Africa.

Hæmatornis. (Vigors.)

Mr. Vigors, at a meeting of the Zoological Society (December, 1831), characterized among the species comprising the 'Century of Birds from the Himalaya Mountains,' drawn and lithographed by Mr. and Mrs. Gould, the above-named genus, which Mr. Vigors considered as exhibiting a striking diversity of form among the *Eagles*.

Generic Character.—*Beak* rather strong, sufficiently elongated; upper *mandible* straight at the base, very much curved at the apex; *nostrils* oval, placed obliquely in the *cere*. *Wings* long, subrounded; the first *quill* rather short, the second and third longer, the fourth and fifth nearly equal and longest, the rest gradually decreasing. *Feet* rather weak, subelongated; *tarsi* rough, reticulated with scales; *toes* rather short, reticulated; *claws* strong. *Tail* sufficiently long, somewhat rounded. (Vigors.)

This group was observed to bear a near affinity to the genus *Pandion* in the shape of the bill, wings, and the rugose reticulated scales of the *tarsi*, but to differ from it in the comparative length and weakness of the legs and claws, as well as in having the nails grooved underneath, and not convex as in the latter group. To this genus belongs the *Falco Bacha* (Latham) of Africa, and the Manilla bird then lately described in the Proceedings (page 96), under the name of *Buteo holospilus*. These, from the ap-

parent weakness of their limbs, had hitherto generally been ranked among the buzzards; although from the description of the courageous habits of the *Bacha Falcon*, the only one well known of the group, doubts had been expressed of the propriety of ranking them with that tribe. Mr. Vigors suggested the subfamily of *Eagles* as a more appropriate station for them; where, united by many important characters to *Pandion*, they apparently led off by the length of their *tarsi* to the genus *Limnaëtus* ('Memoirs of Sir S. Raffles,' Append., p. 648) and others of the long-legged *Eagles*. The three species of the group were exhibited, their general similarity in colour and markings pointed out, and their specific differences explained. These consist chiefly in size, *Hæmat. holospilus* being one-third smaller than *H. Bacha;* while *H. undulatus* (which is 2 feet 7 inches in length) considerably exceeds the latter. The first is spotted all over the body, the second only on the abdomen, while the third is marked by spots on the wing-coverts, and by *ocelli* bearing an undulated appearance upon the abdomen, the breast also being crossed by undulating *fasciæ*. A specimen of *H. undulatus* was afterwards (January, 1832) exhibited from Mr. Hodgson's Nepaul collection. It agreed accurately with that which had been previously exhibited, except in size; the present specimen being about one-third longer. From this difference in size it was conjectured to be a female. Colonel Sykes identified a specimen shot in the Dukhun (Deccan) with *Hæmatornis Bacha*. (Zool. Proc.)

Description of *H. undulatus* (male and female probably). *Back* and *wings* intense brown; *head* crested, the feathers white at the base, of a dark brown, nearly approaching to black at the end, the hind ones being margined with a light rufous band at the apex. The *wing-coverts* near the carpal joint deep brown, marked with small white spots; *quill-feathers* fuscous, darker at the apex, and marked with white towards the base of the interior web; the *cere*, base of the *beak*, and *legs*, yellow; *claws* black. (Vigors, in Gould's 'Century of Birds from the Himalaya Mountains.')



Hæmatornis undulatus, from the work above quoted, by permission.

* *

Short-winged Eagles.

Harpyia. (Cuvier.)

Beak, above, convex. Upper *mandible* slightly toothed. *Nostrils* semilunar, transverse. *Tarsi* elongated, very strong, feathered at the base. *Acrotarsia* scutellated. *Claws* long, very strong, acute.

Mr. Vigors, in placing *Harpyia* next to *Aquila*, observes that the former equals the latter in size and powers of body. Its *tarsi*, he remarks, are strong, thick, partly plumed, with scutellated *acrotarsia*. The *nares* are elongated, apparently semilunar, and placed transversely on the *cere*. The upper mandible, he adds, seems to have a notch somewhat analogous to that of the true *Falcons*. The type is *Falco imperialis* of Shaw.

This powerful bird is the *Grande Harpie d'Amerique* of the French, *Aquila coronada* of the Spanish, *Falco destructor* of Daudin, *Aigle destructeur* of Sonnini, *Grand Aigle de la Guiane* of Mauduyt, *Harpyia destructor* of Cuvier. Mr. Vigors states with truth that much confusion has arisen as to the synonyms of this bird, and even as to the characters of the genus. Mr. Bennett has, in our opinion, well cleared this confusion away, and we therefore select his synonymy.

'M. Temminck,' says the last-mentioned zoologist (*Gardens and Menagerie of the Zoological Society delineated*, vol. ii.), 'the latest writer on this magnificent bird, positively denies its identity with the *Vultur harpyia* of Linnæus, and the crowned eagle (*Vultur coronatus*) of Jacquin, on the singular ground that those names indicate a smaller bird with longer and more slender legs. Now Linnæus, who borrowed his original description of the harpy from Hernandez, asserts, on the authority of that writer, that it is equal in size to a common ram; and Jacquin states his bird to have measured full two feet and a half in height in its natural sitting posture, and almost two inches in the diameter of its legs. It is impossible to read the descriptions of Hernandez and Jacquin, making in the case of the former some little allowance for exaggeration, without feeling a conviction that they both refer to the bird now under consideration. That of the latter author in particular is admirably characteristic. Linnæus originally founded his species on the indication given by Hernandez in the tenth edition of his 'System' he suggested a comparison between it and a bird seen by a friend, probably a pupil, in the Royal Menagerie at Madrid, which there is every reason to believe, from the description given, to have been just. It was only in the twelfth edition of his immortal work that he introduced a slight confusion by adding to the citation from Hernandez, to the account furnished by his friend, and to some particulars extracted from Jacquin's then unpublished description of his supposed species, a synonym from Marcgrave, which can alone justify M. Temminck's criticism. We restore without hesitation both these synonyms of Linnæus and Jacquin, excluding only from the twelfth edition of the *Systema Naturæ* the references to Marcgrave and his copyists. With the *Vultur harpyia* of Linnæus and the *Vultur coronatus* of Jacquin are necessarily included among the synonyms of the Harpy eagle the *Falco harpyia* and the *Falco Jacquini* of Gmelin, by whom the trivial name assigned by Jacquin to his bird was changed on account of its introduction into a genus in which that appellation was pre-occupied. In the year 1778, Mr. Dillon observed, in the Menagerie of Buen Retiro at Madrid, a species of eagle, which he imagined to be 'an undescript kind not taken notice of by Linnæus.' This bird, which he figures in his Travels through Spain under the name of the *Crested Falcon*, is evidently of the same species with the harpy, although the representation is rudely executed, and in some respects, as for example the length of the beak, grossly caricatured. We might almost be tempted to suspect that the specimen seen by him was identical with that described by Linnæus from the same menagerie twenty years before, were it not that the latter bird is expressly called Mexican, while that of Mr. Dillon is stated to have come from the Caracas. For this reason Dr. Latham introduced it into his Synopsis under the name of the *Caracca Falcon*.

'Gmelin, quoting from Latham, soon after latinized its former name into *Falco cristatus*, and this may therefore be added to the synonyms of our bird, of which Mr. Dillon's was the first published figure. The next original describer of the Harpy Eagle was Mauduyt, who also regarded his specimens as nondescript, and gave them the name of *Grand Aigle de la Guiane*, from the country whence they were obtained. To these birds, which formed part of the collection of the Paris Museum, Daudin, in his Ornithology, published in 1800, applied the scientific appellation of *Falco destructor;* and the names given by these two writers have been generally adopted on the continent of Europe as the only ones certainly applicable to the species. M. Sonnini seems doubtful whether or not to regard the two specimens described by him as distinct species, and names the one *Aigle destructeur*, and the

other *Grand Aigle de la Guiane*; but there seems no sufficient reason for their separation. Dr. Shaw's *Falco imperialis* is founded on this indication of Sonnini. In all probability the *Crested Eagle* of Stedman's 'Expedition to Surinam,' spoken of as a very strong and fierce bird, belongs to the same species. Figures of the harpy are likewise given by M. Cuvier in his 'Règne Animal,' by M. Vieillot, in the second edition of the 'Nouveau Dictionnaire des Sciences;' and by M. Temminck, in his 'Planches Coloriées.' Those of the two last-named works are strikingly characteristic. That of the 'Dictionnaire' exhibits the crest-feathers equally and stiffly elevated round the back part of the head, a state in which we have never seen them in our bird, and which, on account of their laxity, and the lower position of the middle ones, we doubt their power to assume. It is right however to remark, that the crest is stated by Linnæus and other authors to possess this power of elevation round the head in form of a crown, an ornament alluded to in the Spanish name of the bird, *Aquila coronada*, and in the trivial appellation, *coronatus*, affixed to the species by Jacquin. We believe that we have now restored to this bird all the original synonyms which unquestionably belong to it. The original descriptions of Hernandez, Linnæus, Jacquin, Mauduyt, Daudin, and Sonnini, and the figures of Dillon, Shaw, Cuvier, Vieillot, and Temminck, are such as leave no doubt upon our minds of the accuracy of the references to those authors. We have purposely abstained from mentioning others which have been occasionally quoted, but which either do not appear to us to be satisfactorily determined, or are evidently founded on mistake. Of the former class, the *Ouyra-Ouassou* of Lery, or Royal Bird of Prey of Brazil, may serve as an example; of the latter, the *Calquin* and *Tharu* of Molina.'

Description (adult).—*Head* with thick downy plumage, of a light slaty-gray. *Crest* arising from the back part, of numerous broad feathers increasing in length towards the middle line of the head, and thus assuming a rounded form, of a dull black, with the exception of a slight margin of gray on the tips of the longer feathers, and a more extensive tinge of the same colour on those of the sides. This crest is slightly raised above the level of the feathers of the back of the neck when the bird is quiet, but is capable of being elevated at right angles with them upon any sudden excitement. In this state, to an observer placed in front of the bird, the middle feathers of the crest are rarely visible, on account of their being inserted much lower down than the lateral ones; while the latter, converging on either side, form, as it were, two lax ear-like processes. Below the crest, the whole of the *back* and *wings*, together with a *broad collar* round the fore part of the *neck* black, each of the feathers of the back terminating in a narrow transverse somewhat lighter streak. *Under surface*, from the breast backwards, pure white; plumage of the legs white with blackish transverse bars. *Tail* with four transverse black bands, of about equal breadth with the four alternating whitish or ash-coloured spaces; the tip light ash. (Bennett.)

Immature bird.—*Upper parts* mottled with brown gray and whitish; *cheeks, occiput, throat,* and *under parts* light gray, with a few black feathers in front of the *neck*, and some large irregular black spots on each side of the lower surface of the *tail-feathers* on a light ash-coloured ground. (*Falco imperialis*, Shaw); (Vieillot, young female?). *Back* and *wings* grayish fawn-colour, irregularly marbled and spotted with black; *collar* ashy-fawn, more or less spotted with black; bars crossing the *legs* fewer and more irregular; all the *lower parts* whitish-fawn sprinkled with darker spots; upper surface of *tail* ash-coloured, with small blackish spots; patches of black mark the places of the future bands which gradually increase at each change; under surface whitish, dotted with fawn. (Temminck.)

(Bird further advanced.) *Collar, crest, back,* and wing-coverts almost uniformly gray; *quill-feathers* of the wings black; *under surface* of body dirty white; each of the *tail-feathers* marked beneath by four large black patches crossing its shaft and occupying about half its width. (Bennett.)

Upper mandible very thick at the base, straight for some distance, and suddenly curving downwards with a strong arch towards the sharp point; *lower mandible* straight, short and blunt; *nostrils* transverse and oval; *wings* when closed not reaching beyond the middle of the *tail*, which is rounded at the extremity; *legs* feathered on the upper part of their anterior surface only, the rest naked and reticulated; *talons* extremely strong, internal and posterior ones very long. Mr. Bennett observes that in some of these characters, as for instance the nakedness of the legs, the harpy approaches the sea-eagles; but it differs from them in many essential points, and in none more remarkably than in the shortness of its wings, and the robustness of its legs and talons; the former character rendering it, like the short-winged hawks, more adapted for preying near the surface of the ground on gallinaceous birds and quadrupeds, and the latter enabling it to carry off a prey of much greater magnitude.

Habits.—The harpy is stated to be a solitary bird, frequenting the thickest forests, where it feeds upon the *sloths*. It also preys on fawns and other young quadrupeds. Sonnini observed it sitting motionless and uttering no cry, on a high tree on the banks of the Orapu. Hernandez does not seem inclined to detract from the powers of the bird, for he says that it will attack the most fierce beasts, and even man himself; and he further states that it may be trained like a hawk to pursue game. Linnæus gives the bird credit for strength sufficient to split a man's skull with a single blow (unico ictu). These accounts of its prowess must be taken with some grains of allowance, but that the bird is very powerful is without doubt. Jacquin's specimen was found dead in the ship that was conveying it to Europe, and its death was with some probability attributed to the sailors, whose monkeys the eagle had destroyed. When these animals gambolled too near its cage they were seized by its talons and devoured with almost all their bones, but not their skin, which the bird invariably stripped off. The harpy which was obtained by Mr. Hesketh, consul at Maranham, near the mouth of the river Amazon, and brought to England by Captain (now Major) Sabine, by whom it was presented to the Horticultural Society, which transferred it to the Zoological Society, in whose collection at the Regent's Park it now (1837) is, is said to have destroyed and eaten a king of the vultures (*Sarcoramphus Papa*) while on its passage to England. After its arrival a cat was put into its cage, and the eagle, with one blow of its immense foot, broke its back.

Localities.—Mexico (Hernandez, Linnæus, and others); neighbourhood of the river Magdalena, in New Granada (Jacquin); Caracas (Madrid specimen): Guiana (Sonnini)



Harpyia Destructor.

Morphnus (Cuvier.)

Beak convex above; *nostrils* elliptical; *tarsi* elevated, rather slender; *acrotarsia* scutellated; *toes* rather short; *claws* acute.

Mr. Vigors observes, that this genus differs from *Harpyia* in its more slender, lengthened, and scutellated *tarsi*, and the comparative weakness of its toes. It is separated into two sections, as the *tarsi* are plumed or otherwise; among the former M. Cuvier arranges *Falcones occipitalis, ornatus*, and *albescens* of Daudin, and *F. maculosa* of Vieillot; among the latter, *F. Guianensis* of Daudin, and *F. Urubitinga* of Gmelin. *Spizaëtus* of Vieillot corresponds with this group.

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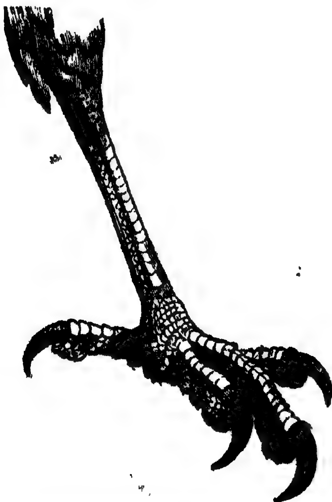
Tarsi naked.

Example, *Morphnus Urubitinga, Falco Urubitinga* of Gmelin, *Aquila Brasiliensis* of Brisson, *Brasilian Eagle* of Latham, *Urubitinga* of Marcgrave, Willughby, Ray, and others. The following is Willughby's

Description.—This bird is like an eagle of the bigness of a goose of six months old. It hath a thick hooked black beak; a yellowish skin (cere) about the nostrils; great sparkling aquiline eyes; a great head; yellow legs and feet; four toes in each foot, disposed after the usual manner; crooked, long, black talons; large wings; a broad tail. It is all over covered with dusky and blackish feathers; yet the wings are waved with ash-colour. The tail is nine inches long, white for six, the end for three inches being black; howbeit in the very tip there is again a little white.

Young of the year.—Blackish yellow below; the centre of each feather marked with blackish brown tear-like spots; throat and cheeks with brown striæ on a whitish ground. Locality, Brazil and Guiana, where it is said to seek its prey on inundated places





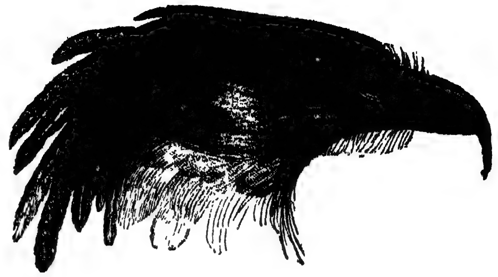
Head and foot of Morphnus Urubitinga.

* *

Tarsi feathered.

Example.—*Morphnus occipitalis, Falco occipitalis* of Daudin, *L'Aigle-autour noir huppé d'Afrique*, and *Huppart*.

Description.—Size of a crow; black, with a long crest or tuft dependant from the occiput; tarsi, edge of the wing, and bands on the tail, whitish. Locality, Africa.





Head and foot of Morphnus occipitalis.

Cymindis (Cuvier).

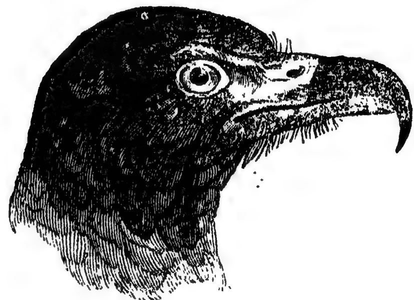
Beak convex above; *nostrils* nearly closed, rimiform; *tarsi* short, semipalmated.

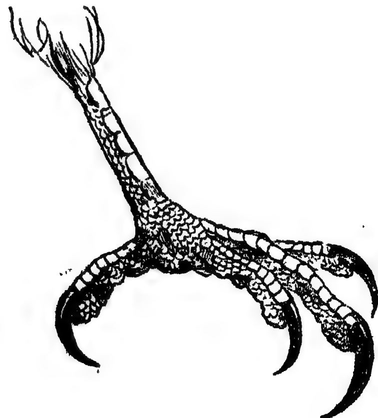
Distinguished by their short, half-plumed, and reticulated *tarsi*, and more particularly by their nostrils being nearly closed, and bearing the appearance of a narrow slit or channel.

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Acrotarsia scutellated.

Example.—*Cymindis hamatus Falco hamatus* of Illiger.





Head and foot of Cymindis hamatus.

Description.—(Adult) upper mandible extremely hooked; *cere* and *feet* yellow; all the plumage uniform lead colour. Length 15 inches 6 lines (French).

Young of the year.—Plumage sombre brown, each feather bordered and blotched with red; summit of the *head* and *cheeks* marked with yellowish elongated spots; a yellowish band below the eyes; front of the neck whitish. Locality, Brazil.

* *

Acrotarsia reticulated.

Example, *Cymindis Cayennensis*, *Falco Cayennensis* of Gmelin, *Petit autour de Cayenne.*

Description.—Summit of the *head* ash-coloured; *back* (manteau) brown, barred with deeper brown; *belly* white; *tail* grey, barred with white beneath; *feet* ash-coloured. Locality, Cayenne.





Head and foot of Cymindis Cayennensis.

Asturina (Vieillot).

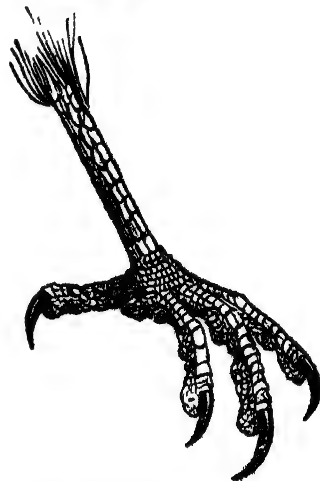
Beak convex above; *nostrils* lunulate; *tarsi* short, somewhat slender; *claws* long, very acute.

Example, *Asturina cinerea.*

Description.—Bluish ash-colour; whitish bands on the under part of the body; *tail* traversed by two black stripes, white at the point; *beak* blue below; *cere* blue; *feet* yellow. *Locality*, Guiana.

Mr. Vigors observes, that it is among these *short-winged Eagles* that the greatest difficulty prevails in deciding on their immediate affinities. Being for the most part extra-European, and not within the reach of general examination, their manners also being but little noted, and the characters on which we depend for forming our decision respecting their affinities being for the most part passed over in the descriptions given of them, it is only by conjecture that we can assign them a place in the general arrangement. Of this nature, he remarks, is the genus last described. The same difficulty, he adds, extends to several other described species of the *Falconidæ*, which appear to him to belong to the group of *short-winged Eagles*, although they have been assigned a different locality by the authors who have described them. Among these is the *Falco Bacha* of Daudin, which has been generally ranked with the *Buzzards*. Its short wings and lengthened bill, however, seem, according to Mr. Vigors, to bring it among the present group of the *Eagles*; and its habits, as described to him by Dr. Horsfield, who had an opportunity of closely observing them in the Island of Java, where the birds are by no means uncommon, do not in any respect correspond with the *Buzzard* tribe. Mr. Vigors would place it, together with *F. albidus* of Cuvier, near those species of the genus *Cymindis* which are distinguished by





Head and foot of Asturina cinerea.

the reticulated *acrotarsia*, if not in that genus itself. He has, indeed, some doubts whether most of the short-winged *Falconidæ* at present placed among the *Buzzards*, such as *F. buson* and *F. tachiro* of Daudin, *F. pæcilonotus* of Cuvier, &c., may not be more properly removed to a situation between the *short-winged Eagles* and the *Hawks*, with both of which they seem to have a considerable affinity. There is, continues Mr. Vigors, another group which also appears allied to the present, distinguished by a rather feeble and elongated bill, short wings, and slender, lengthened *tarsi*, feathered to the toes. It includes *F. limnæetus* of Horsfield (*Zool. Res.*, No. 6, Pl. Col. 134), *F. niveus* of Temminck (Pl. Col. 127), and *F. atricapillus* of Cuvier (Pl. Col. 79.) These appear to be strongly allied, in the opinion of Mr. Vigors, if not to appertain, to the before-mentioned genus *Morphnus*. *F. tyrannus* of Prince Maximilian (Pl. Col. 73) bears also, Mr. Vigors thinks, a strong similitude to the same group, though partially differing in external characters.

2. Sub-family *Accipitrina* (Hawks).

Beak short, hooked from the base; *wings* short, fourth *quill* longest.

'The short wings of the last groups,' writes Mr. Vigors, 'lead us to the present division of *Hawks*, all of which, a considerably extensive tribe, are characterized by their wings extending no further than two-thirds of the extent of their tail. The fourth quill-feather is the longest, the first, second, and third, gradually exceeding each other in length. In this division we may observe that the upper mandible, though not furnished with distinct teeth like the true *Falcons*, has the festoon or prominence that generally supplies its place more strong and angular than is usual among these tribes. In some of the *Accipitres* this is particularly distinguishable. The sub-family we have just quitted includes all the birds of the present family in which the beak is straight at the base, and hooked only at the apex. We now enter upon the first of those groups where the bill is curved from the base, a character that extends through the remainder of the *Falconidæ*. It may be observed, that this character, which thus separates the family into two departments, was equally noticed as a mark of distinction between the species known to the antients. Pliny, apparently referring to it as a line of demarcation between them, divides the group into his two departments of *Aquilæ* and *Accipitres*. It is from adopting the same views respecting

the family, that M. Brisson instituted his two leading divisions, to which he assigned corresponding denominations.'

Dædalion (Savigny).

Beak short; *tarsi* moderate; *acrotarsia* reticulated; type *F. cachinnans* of Linnæus, and *F. melanops* of Latham.

Mr. Vigors adopts the name which was conferred by M. Savigny on the whole of the sub-family, for the present division of it.

Example, *Dædalion melanops.*

Description.—(Adult male) white, flamed with black on the *neck* and *breast*; *back*, *wings*, and *tail*, deep black, the last with a white stripe, and terminated with white; there are dots of the same colour on the coverts of the *wings*; *cere* and *tarsi* reddish. *Locality*, Guiana. The form may be illustrated by the



Head and foot of Dædalion cachinnans.

Astur (Bechstein).

Beak short; *nostrils* suboval; *tarsi* moderate; *acrotarsia* scutellated.

Mr. Vigors observes, that *Astur* is a title which has been applied to the whole group, but which may be confined to those whose tarsi, moderate in length, have their *acrotarsia* scutellated or covered with broad and even scales. He considers our European species, *Falco palumbarius* of Linnæus, as the type; to which may be added *F. Novæ Hollandiæ* of Latham, and a considerable number of corresponding species from every quarter of the globe.

Example, *Astur palumbarius.*

Description.—This is the *Autour* and *Atour* of the French; *Astore* (Zinan.) and *Girifalco* (Bonaparte), *Sparviere da columbe* and *Sparviere Terzuolo* of the Italians; *Grosser gepfeilter Falck* and *Hunerhabicht* of the Germans; *Goshawk* of the modern, and *Hebog Marthin* of the antient British.

A full-grown *female* measures from twenty-three to twenty-four inches in length; the males one-fourth, and sometimes one-third less; but when adult, the plumage is nearly similar. The beak is horn-colour or bluish-black; the cere and irides yellow; the top of the head, the whole of the back, upper surface of the wings, and tail-feathers, dark greyish-brown; in females the colour inclines to clove-brown; the upper surface of the tail-feathers barred with darker brown; a band passing over the lore, eyes, cheeks and ear-coverts; the nape of the neck, throat, breast, belly, and thighs, nearly white, with spots, transverse bars, and undulating lines of dull black; under tail-coverts white; lore, cheeks, and ear-coverts, greyish-brown, forming an elongated dark patch on the side of the head; the legs and toes yellow; the claws black.

Young birds have the beak, cere, and eyes, nearly similar to those of the old birds; the top of the head, nape, and ear-coverts, ferruginous white, each feather darker in the middle; back, wings, and upper tail-coverts, brown, margined with buff; upper surface of the tail-feathers with five bands of dark-brown and four bands of lighter brown, the ends of all the feathers white; wing-primaries dark-brown, barred with two shades of brown on the inner webs; the chin, throat, breast, and belly, greyish-white, each feather with a central elongated patch of dark-brown; thighs and under tail-coverts with a dark-brown longitudinal streak instead of a brown patch; under surface of the wings greyish-white, with transverse dusky bars; under surface of the tail-feathers greyish-white, with five darker greyish-brown transverse bars, the tips of all the feathers white; legs and toes yellow-brown; the claws black; those of the inner toe considerably larger than those of the outer. (Yarrell.)

Habits, Food, Reproduction.—Flies low and pursues its prey in a line after it, or in the manner called 'raking,' by falconers. If the game takes refuge it will sit patiently on a tree or stone till it moves, or till some other prey is accessible. *Food*, hares, rabbits, pigeons, pheasants, grouse, and partridges. The female was generally flown by falconers at fur, and the male at feather, but the female was also trained to take the larger winged game, the male being principally flown at partridges. Turbervile says, 'you shal not neede to shew any other game to a goshawke for her first entring than a partridge, because in learning to flee the partridge they prove most excellent; and the first yeare you shall doe best to flee them to the field, and not to the covert, for so will they learne to hold out (and not to turne tayle) in the middest of their flight: when they be mewed hawkes, you may make them doe what you will; and understand you, that you shall not neede to take such pain, nor to use such art in making of a goshawke which is taken a brancher as with a *Nyasse*, for she will alwayes know of her selfe what to doe.' (*The Book of Falconrie.*) *Nest*, on a high tree in the outskirts of the forest; rarely found in the interior, except in those parts which are open and free from timber. Eggs three or four, frequently hatched in the middle of May. (Hewitson, *ex relatione* Hoy.) Mr. Yarrell says that the eggs are rare, and that the few which he has seen were uniform in size and colour, 2$\frac{3}{16}$ths inches in length by 1$\frac{13}{16}$th inch in breadth, of a pale bluish-white, without any spots or streaks.

Locality.—Denmark, Norway, Sweden, Siberia, Russia, and Chinese Tartary. (Müller, Linnæus, Pennant.) Very common in France, Germany, Russia, and Switzerland; more rare in Holland. (Temminck.) Rare in the south of England. Mr. Yarrell says 'the few that are used for hawking are obtained from the continent. Colonel Thornton, who kept them constantly in Yorkshire, procured some of his specimens from Scotland. Dr. Moore, in his catalogue of the birds of Devonshire, says that it is found occasionally in Dartmoor, but I can find no record of its appearance farther west in England, nor any notice of it in Ireland. A fine adult male was trapped by a gamekeeper in Suffolk in March, 1833; and Mr. Doubleday, of Epping, has sent me word that he received a young bird from Norfolk in the spring of the same year. Mr. Selby mentions that he had never seen a recent specimen south of the Tweed, but states that it is known to breed in the forest of Rothiemurcus, and on the wooded banks of the Dee. Mr. Low says that this species is pretty frequent in Orkney; but as he speaks of it in connexion with sea-beaten rocks without shelter or woods, is there not reason to suspect that Mr. Low was mistaken, and that the birds he saw were Peregrine Falcons?—the more so, as several recent visitors to these northern islands have observed peregrines but no goshawks.' (*British Birds.*) Prince Bonaparte has noted the goshawk as not common in the neighbourhood of Rome, and as rare in that of Philadelphia. Dr. Richardson (*Fauna Boreali-Americana*) describes one shot in company with the female at the nest on the plains of the Saskatchewan, and states that another specimen was

killed in the woody country three or four degrees of latitude farther north than the preceding. He records another killed near Jasper's House, on the Rocky Mountains, and a fourth killed at York Factory, supposed to be a young bird of the season (the specimen noticed by Mr. Sabine in 'Franklin's Journey').

The *Falcon-Gentil* is supposed to be the female and young of this species, which is the *Ash-coloured* or *Black-capped Hawk* of Wilson.

Colonel Sykes describes an *Astur* (*A. hyder*) among his birds of the Dukhun (Deccan), and there are specimens of *Astur musicus* and *A. melanoleucus* in the South African Museum.



Astur palumbarius.

Accipiter (of Ray, Brisson, and authors).

Beak short. *Nostrils* suboval. *Tarsi* elongated, smooth. *Acrotarsia* scutellated, the suture scarcely to be discerned. Type, the *Common Sparrow-hawk, Accipiter fringillarius* of Ray: to which, says Mr. Vigors, may be added many corresponding species which do not seem to have any limits to their geographical distribution.

Description.—The *Sparrow-hawk* is *L'Epervier* of the French; *Falco palombino* and *Sparviere da fringuelli* of the Italians; *Die sperber* of the Germans; *Sparfhoek* of the Fauna Suecica; *Falco Nisus* of Linnæus; and *Gwepia* of the antient British.

Adult Male.—About twelve inches in length; *beak* blue, lightest at the base; *cere* greenish-yellow, the *irides* yellow; top of the *head*, nape of the *neck*, *back*, *wings*, and *wing-coverts*, rich dark-brown—in very old males with a tinge of bluish-grey; *tail-feathers* grayish-brown, with three conspicuous transverse bands of dark-brown; *chin, cheeks, throat, breast, belly, thighs*, and under *tail-coverts*, rufous, with numerous transverse bars of darker rufous brown; *legs* and *toes* long, slender, and yellow; the claws curved, sharp, and black.

Female.—Generally three inches longer than the male; *beak* bluish horn-colour; *cere* yellowish, the *irides* yellow; top of the *head*, upper part of the *neck, back, wings*, and *tail-coverts*, brown—the base of many of the feathers white, which, extending beyond the edge of the feather immediately above it, causes a white spot or mark; *primaries* and *tail-feathers* light-brown, barred transversely with darker brown; under surface of the *neck, body, wing-coverts*, and *thighs*, greyish-white, barred transversely with brown; under surface of the *wing* and *tail-feathers* of the same colour, but the light and dark bars much broader; the first six *wing-primaries* emarginated; the fourth and fifth *quill-feathers* equal and the longest, the first *quill-feather* the shortest; *legs* and *toes* yellow; *claws* long, curved, sharp, and black.

Young Male.—Resembles the female; but the brown feathers of the *back* and the *wing-coverts* are edged with reddish-brown; feathers of the *tail* reddish-brown, particularly toward the base, with three conspicuous dark-brown transverse bands. In other particulars like the female: both have a collar formed by a mixture of white and brown, which extends from the sides of the neck to the nape. (Yarrell.)

Habits, Food, Reproduction.—Haunts, wooded districts. The great enemy of small quadrupeds and birds, and often very destructive to young chicks in poultry-yards in the breeding season. Used in falconry; the best of all hawks for landrails. (Sebright.) *Nest.* 'The *Sparrow-hawk* generally takes possession of some old or deserted nest in a tree, most frequently that of the crow, in which the female deposits four or five eggs, each about one inch seven lines long, by one inch four lines broad, of a pale bluish-white, blotched and spotted with dark-brown. The young are covered with a delicate and pure white down, and are abundantly supplied with food. Mr. Selby mentions having found a nest of five young sparrow-hawks, which contained besides, a lapwing, two blackbirds, one thrush, and two green linnets, recently killed, and partly divested of their feathers.' (Yarrell.)

Locality.—Spread throughout Europe, Japan (Temminck), Smyrna (Mr. Strickland), Denmark, Sweden, Norway, Russia, and from thence southward over the European continent to Spain and Italy. Common in most of the counties of England, and has been observed in the west and north of Ireland; occurs also in Scotland and its northern islands. (Yarrell.) Very common, migratory, near Rome. (Bonaparte.)





Head and foot of Accipiter fringillarius.

The form is widely spread. Col. Sykes records *Accipitres Dukhunensis* (resembling *A. fringillarius*, but differing in certain points), and *Dussumieri* among the birds of the Dukhun (Deccan). In the South African Museum will be found *Accipitres polyzonus, polyzonoïdes, niger, Gabar, Tachiro, minulus*, and *rufiventris*.

Mr. Vigors remarks that there are some species which seem to be allied to this sub-family and to be intermediate between it and the succeeding sub-family of *Falconæ*, which, from some peculiarities of character, cannot well be appended

to any established genus. They possess, he observes, a shortness of wing which would incline us to refer them to some of the present groups: but their upper mandible, strongly and doubly dentated, presents a character that will not admit of their being included in any of the foregoing genera, in which the mandibles are entire, or where the place of the tooth is supplied by a rounded prominence. These species Mr. Vigors would have wished to arrange in one genus: but they are found to differ in essential points which bring them respectively within the pale of the two conterminous sub-families now under consideration; and he feels obliged, for the sake of perspicuity, to adopt the following genus of which the type is *Falco bidentatus* of Latham.

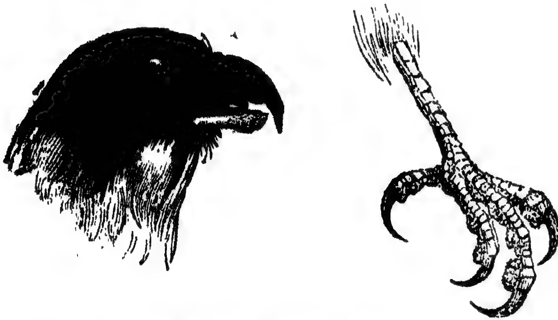
Harpagus. (Vigors. Bidens* of Spix.)

Beak short. Upper *mandible* strongly bidentated, lower with a double notch. *Tarsi* moderate. *Acrotarsia* scutellated. Third and fourth *quills* longest, equal.

Mr. Vigors observes that the essential characteristic of this group is the double tooth on both the upper and lower mandible. The wings, which correspond with those of the other *Hawks*, in being one-third shorter than the tail, have the third and fourth quill feathers, which are the longest, of equal length. The *tarsi* are of moderate length and strength, and have the *acrotarsia* scutellated as in the latter groups of the present sub-family. The *nostrils* are of a semicircular form and the *cere* is naked.

Example, *Harpagus bidentatus*. Locality, Brazil, and Guiana.

Description.—Length, a foot and some lines (French). Slate-colour above; *throat* white; *breast* and *belly* red, undulated with yellowish; lower coverts of the *tail* white; *tail* nearly equal, brownish, barred with whitish.



Head and foot of Harpagus bidentatus.

Mr. Vigors remarks that *Falco Diodon* of Temminck is to be referred to this genus.†

Gampsonyx. (Vigors.)

Beak short, *mandibles* entire. *Nostrils* rounded. *Wings* short, second *quill* longest, third generally equal to the second, and internal web of the first and second strongly notched near the apex. *Tail* moderate, equal. *Feet* moderate; *tarsi* reticulated, *acrotarsia* feathered below the knee to the middle. (Vigors.)

'The genus is founded on a small and beautiful *Hawk*,' writes Mr. Vigors in 'The Zoological Journal,' vol. ii., 'which has been kindly submitted to my inspection by Mr. Swainson, one of the fruits of that gentleman's extensive researches in Brazil. This bird decidedly belongs to the *Accipitrine* sub-family of the *Falconidæ*; but it is placed at that remote extremity of it, where the species, gradually approaching the *Falcons*, partially assume some of their leading characters. It possesses the bill of the *Hawks*, and also the shortness of wing which so strongly characterizes them: but the structure of the wing itself is the same as in *Falco*, the second quill-feather being the longest, and the first and second of these feathers being marked on the same web by an abrupt emargination near the *apex*; while the *tarsi* also display the character of the same group in having the *acrotarsia* reticulated. The bird thus exhibits a striking modification of form, at once partaking of the chief of the respective characters of both the *Hawks* and *Falcons*; with the former of which it may in addition be observed that it agrees in its general form, and with some of the latter, particularly the beautiful group of *Ierax cærulescens*, in its colours, and in the general distribution of them. To the latter group indeed it has a striking resemblance, and might perhaps be referred unconditionally to it, could we pass over the important character of the untoothed bill.'

Description of *Gampsonyx Swainsonii*. Above cineraceous-black, white beneath; *front, cheeks, sides* of the *abdomen*, and femoral feathers orange; a black spot on each side of the *breast*.

Beak black. Feathers of the *back* and *scapulars* ashy-black, spotted with ferruginous. Lower *side* and *nuchal collar* white, sparingly variegated with orange. *Primaries* blackish, internally margined with white at the apex; *secondaries*, sparingly sprinkled with ferruginous, beneath white. *Tail-feathers* ashy-black, internally (the middle excepted) margined with white, beneath white. *Feet* yellow, *claws* black. Length of the body 9⅜ inches. (Vigors.)

Locality, Brazil. Mr. Vigors says that the following MS. note was appended to this bird in Mr. Swainson's handwriting:—'The only individual of this species I ever met with was shot on the Table Land, about 10 leagues in the interior of Bahia, in a direction west-south-west from the bay of St. Salvador. It was perched on the trunk of a withered tree, apparently watching some small birds. The *tarsi* are bright and the *irides* hazel.'

3rd. Sub-family, *Falconina* (Falcons).

Beak short, hooked from the base. *Wings* long. Second *quill* longest.

Mr. Vigors observes that this, closely allied to *Harpagus* by the double tooth on its upper mandible, is another group for which he proposes the name of

Ierax.* (Vigors.)

Beak short, upper *mandible* strongly bidentated, lower simply notched. *Tarsi* moderate. *Acrotarsia* scutellated. *Wings* short. Second *quill* longest, slightly notched near the apex.



Hierax cærulescens.

'Whoever,' writes Mr. Vigors, 'has seen that beautiful species, the smallest of its race, *Falco cærulescens* of Linnæus, now rendered familiar to us by the accurate and splendid illustrations of Dr. Horsfield, will at once acknowledge its separation from every other established genus of the family. Its upper mandible is strongly and sharply bidentated, as in *Harpagus*, but the under mandible is simply notched as in the true *Falcons*. Its wings, shorter than the tail, differ also from those of *Harpagus*, in having the second quill-feather the longest, thus again establishing the affinity of the genus to the *Falcons*. The *tarsi* are moderate, and the *acrotarsia* scutellated as in the latter group of *Hawks*. From its thus possessing characters in common with both sub-families, it is difficult to say to which we should refer

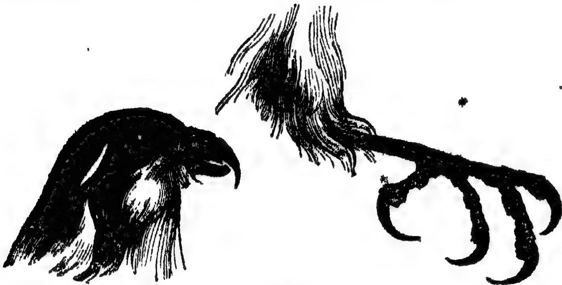
* Mr. Vigors observes that the term *Bidens* is appropriated to Botany, and is indeed a Linnæan genus.

† For the description of Mr. Swainson's genus *Avicida*, the reader is referred to the interesting work on the Birds of Western Africa by that zoologist, 'Naturalist's Library,' vol. [illegible], p. [illegible]. [illegible] Falcon.

* Hierax, [illegible].

it. But I prefer placing it in its present situation on account of the length of the second quill-feather, a peculiarity which distinguishes the true *Falcons*, and gives a striking character to their flight. Placed, however, at the extremity of the division, it preserves its affinity with those that went before.'

Description.—Hierax cærulescens is, according to Dr. Horsfield, the *Allap*, or *Allap-allap* of the Javanese; *Falco cærulescens* of Linnæus; *F. Bengalensis* of Brisson; *Falco parvus Indicus* Ger. Orn.; *Little black* and *orange Indian Hawk* of Edwards; and the *Bengal Falcon* of Latham. Entire length six inches and a half. Upper parts bluish-black and glossy. Throat, breast, axillæ, sides of the neck, forehead, and a line continued from the environs of the bill over the eye and along the neck, white, with a ferruginous tail. Lower part of the breast, abdomen, vent and thighs, ferruginous. Hypochondria, thighs posteriorly, and a broad patch extending from the eye along the side of the head, black; the plumes which cover the thighs behind are terminated by long silky filaments, or radii which are straggling and pendulous, and by their laxity and irregularity afford a peculiar character to the bird. (Horsfield.) The natives told Dr. Horsfield that this small but robust bird was uncommonly bold in the pursuit of little birds. Several individuals were brought to him from the range of the southern hills, which are covered with forests, during his abode at Surakarta. He obtained one in the eastern districts. In the other parts of the Island of Java he did not observe it. Bengal is also given as its locality.



Head and foot of Hierax cærulescens.

Mr. Vigors (*Zool. Proc.* 1831) describes another species, *Hierax erythrogenys*, the size of *H. cærulescens*, from the neighbourhood of Manilla.

Falco.

Beak short. Upper *mandible* strongly toothed; lower notched. *Acrotarsia* reticulated. Second quill longest; first and second deeply notched internally near the apex.

This genus, which includes, as Mr. Vigors observes, the greater portion of the present sub-family, comprises the typical species. 'The upper mandible of this group,' writes that zoologist, 'is armed with a strong angular tooth; the lower is notched near the extremity. The *nares* are rounded. The wings are for the most part as long as the tail, the second quill-feathers being invariably the longest. The first and second quill-feathers are also distinguished by an abrupt emargination on the inner web near the extremity. In some species, as in *F. peregrinus*, the emargination of the second quill-feather is not so abrupt as in others. But in all the species of the true *Falcons* that have come under my examination, this emargination of the first quill-feather at least is strongly apparent. The *tarsi* are moderate in length and strength, and have the *acrotarsia* reticulated. Our European species, *F. peregrinus*, Linn., *F. subbuteo*, Linn., *F. Æsalon*, Linn., *F. rufipes*, Bechst., are readily distinguished as belonging to this typical genus. Some species belonging to the group have the wings somewhat shorter than the tail, which, in conjunction with *Ierax*, thus evinces a gradual series of affinity between the short and long-winged tribes. Among these we may distinguish *F. tinnunculus*, Linn.; *F. rupicolus*, Daud.; with some corresponding species.' Example, *Falco peregrinus*.

Description.—The *Peregrine Falcon* is *Le Faucon pelerin* of the French; *Sparviere pellegrino* and *Falco reale* of the Italians; *Wander Falke* of the Germans; *Apestæ-kæoo* (Little Eagle) of the Cree Indians; *Hebog tramor* and *Cammin* of the antient British.

Adult.—Length from 15 to 18 inches, depending on the sex and age of the bird. *Beak* blue, approaching to black at the point; *cere* and *eyelids* yellow, *irides* dark hazel-brown; top of the *head*, back of the *neck*, and a spot below the eye nearly black; *back* and upper surface bluish-slate or ash colour, becoming lighter at every succeeding moult; the males usually the most so; feathers of *back*, *wing-coverts*, and *tail* barred with a darker tint; *primaries* brownish black, inner webs barred and spotted with rufous white; front of *neck* white, with dark longitudinal lines; *breast* rufous white, with dark-brown transverse bars; *flanks*, under *tail-coverts*, and under surface of the *tail-feathers* barred transversely with dark-brown and greyish-white; *legs* and *toes* yellow, *claws* black.

Young.—Head and upper surface of *body* and *wing-coverts* brownish ash, the edge of each feather rufous; the dark longitudinal streaks on the white under-side of the body more conspicuous, but, gradually shortening and spreading laterally, they ultimately change their direction, and become transverse. This change is first observed on the belly and flanks. (Yarrell.)

Temminck considers the *Lanier* (Lanner) of Buffon the perfect state of the male *Peregrine*. He also adds *Falco Barbarus* of Latham as one of its synonyms.

Habits, Food, Reproduction.—The food of the Peregrine consists of land and water-fowl, rabbits, young hares, &c. It was highly prized in falconry. Turbervile, in his chapter 'Of the Haggart Falcon, and why she is called the Peregrine or Haggart,' gives the following reasons for the name: 'First, because a man cannot find, nor ever yet did any man, Christian or Heathen, find their eyrie in any region; so as it may wel be thought, that for that occasion they have atchieved and gotten that name and terme of Peregrine or Haggart Falcons, as if a man would call them pilgrims or forainers. The second cause is, because these falcons do rangle and wander more then any other sort of falcons are wont to doe, seeking out more strange and uncouth countries, which indeed may give them that title of Haggart and Peregrine Hawks for theyr excellency, because they doe seeke so many strange and forraine coasts, and doe rangle so farre abroad. The third and last cause, I doe thinke, may be their beauty and excellency, because this word (*Peregrino*), or Peregrine, doth many times import an honourable and choice matter had in great regard. . . . Wherefore I conclude that these Haggart Falcons are not of Italie, but transported and brought thither from forraine places, as, namely, from Alexandrie, Ciprus, and Candie. And yet this is for certaine, that in Italie there are taken of these Haggart Falcons, as in the dominion of the renowned duke of Ferrara and in the countrie near Ravenna, being brought thither by force of weather and wind. And by that means there are none of those Haggarts found Eyesses, but they are al either soare Hawks or mewed Haggarts.'

'In the language of falconry,' writes Yarrell, 'the female Peregrine is exclusively called the Falcon, and on account of her greater size, power, and courage, is usually flown at herons and ducks; the male Peregrine, being smaller, sometimes one-third less than the female, is called the Tercel, Tiercel, and Tiercelet, and is more frequently flown at partridges, and sometimes at magpies. Young Peregrines of the year, on account of the red tinge of their plumage, are called, the female a red falcon, and the male a red tiercel, to distinguish them from older birds, which are called Haggards or intermewed Hawks. The Lanner of Pennant is a young female Peregrine, at which age it bears some resemblance to the true Lanner, *Falco lanarius* of authors—a true falcon also, but much more rare than the Peregrine, and which probably has never been killed in this country. Mr. Gould says he was unable to find a specimen in any collection here, either public or private, at the time he was desirous of figuring this species in his birds of Europe. The true Lanner is only found in the south and south-eastern parts of Europe. The king of France, Louis XVI., had Lanners sent annually from Malta; but they were brought from the eastern countries. It exceeds the Peregrine Falcon in size, being intermediate between that and the Gyr-falcon; was much esteemed for flying at the kite, with which the Peregrine is hardly able to contend.' The name of Lanner is confined to the female: the male is called a Lanneret, on account of his smaller size. (*British Birds.*) Our limits will not allow us to enter into any account of the mode of flying it at herons, &c., flying at the brook or at the river, as it was antiently called; and we must refer the reader to Turbervile, among

the old writers, and to Sir John Sebright as the best of the modern authors on the subject. (See Sir John's *Observations on Hawking.*) *Nest.*—On high rocks. In Britain, Mr. Yarrell states that the Peregrine builds on various parts of the coast, more frequently in Scotland than in England. The eggs are from two to four in number, about two inches long by one inch and eight lines in breadth, mottled all over with pale reddish brown. Mr. Selby notices their eyrie at St. Abb's Head. It was from this locality that the late Mr. Baird of Newbyth usually obtained his cast of Hawks, for each of which he gave the persons who undertook the peril of climbing the rock one guinea. Other localities for the nest in Britain are the cliffs between Freshwater Gate and the lighthouse near the Needles. Devonshire and Cornwall, where it is called *Cliff Hawk.* Holyhead and the Great Orme's Head. (Yarrell.) Rocky coast of Caernarvonshire. (Pennant.) Rocky situations inland and marine in Ireland. (Thompson quoted by Yarrell.) Vale of Moffat in Dumfriesshire, the Bass Rock, and the isle of May, in the Forth. (Sir Wm. Jardine.)

Localities.—All the mountainous countries of Europe, particularly on rocks; very rare in champaign countries; never found in marshy districts; abundant in Germany and France; sufficiently common in England and Holland; rare in Switzerland. (Temminck.) Shetland Isles, where it breeds; Denmark, Sweden, Norway, Lapland, and Greenland. (Yarrell.) Uralian and Siberian mountains. (Pennant.) Dr. Richardson, who describes an old male from Melville Peninsula, lat. 68° N., says (*Fauna Boreali-Americana*), 'The Peregrine being a rare bird in the wooded districts of the fur countries where the trading posts are established, I did not procure a specimen on the late expeditions; but I have frequently seen it whilst on the march across the Barren Grounds. Of the two specimens figured by Edwards, one was from Hudson's Bay and the other was caught off the entrance of Hudson's Straits. Captain Parry likewise brought home several male and female specimens from Melville Peninsula, some of which are preserved in the British Museum. It is a summer visitor of the northern parts of America, and frequents the coasts of Hudson's Bay and the Arctic Sea, with the Barren Grounds, but is very seldom seen in the interior. It preys habitually on the long-tailed ducks (*Anas glacialis*), which breed in great numbers in the Arctic regions, arriving in June and departing in September. Captain Parry observed it, in his second voyage, following flocks of the snow-bunting on the coast of Greenland, near Cape Farewell. It frequents the shores of New Jersey and Pennsylvania in the winter, and is celebrated there for the havoc it makes among the water-fowl. Mr. Ord states that the ducks which are struck by it are lacerated from the neck to the rump; it gives the blow in passing, and returns to pick up its bird.' Port Famine, straits of Magalhaens. (Captain King.) New Holland. (Vigors and Horsfield.) Cape of Good Hope. (Dr. A. Smith.) Prince Bonaparte notes it as rare, and as seen only in winter near Rome, and as rare and casual near Philadelphia. Dr. Smith (*South African Museum*, No. 94) says that the bird so numbered, though it does not exhibit exactly the plumage of the Peregrine Hawk of Europe, yet approaches it so closely, that it might be considered as attempting too great a refinement to class it as a different species.



Falco peregrinus.

Mr. Vigors observes that Cuvier has separated the *Falco Islandicus* of Latham from the rest of the true *Falcons*, under the generic title of *Hierofalco*, which he characterizes as possessing no tooth on the upper mandible, but a rounded prominence in the centre, and in which he observes that the wings considerably fall short of the tail in length. In this opinion Mr. Vigors does not acquiesce. He cites examples of the Jerfalcon in its different stages of growth, and in none did he perceive any material difference between its bill and that of the true *Falcons.* He adds that he feels much hesitation in advancing the above opinion, not merely on account of the known accuracy of Cuvier, but on account of some facts that had then lately come to his knowledge. He mentions a specimen in the British Museum, in which the mandible accords exactly with Cuvier's description—'Il n'a qu'un feston comme celui des ignobles.' In several specimens from the arctic regions, however, in the same collection, he found the tooth. After referring to the figures quoted by Cuvier, and their discrepancies, he inquires whether it may not be possible that there are two species. He cannot think that the character itself is variable, or that Cuvier would have adopted one which must have been known to him as such, even from the plates. 'In no specimen of a true falcon,' says Mr. Vigors, 'have I seen the slightest alteration of the tooth, except by accident.'

Our limits will not permit us to do more than hint at the other species of *Falco.* *F. chicquera,* Himalaya Mountains (Gould), Deccan (Sykes), South Africa (Smith), seems to be the nearest in typical points to the Peregrine Falcon. The following *Falcones*, besides *F. peregrinus* and *F. chicquera*, are in the catalogue of the South African Museum; *biarmicus, rupicolus, rupicoloïdes, subbuteo,* and *Swainsonii*: *F. tinnunculus, the Kestrel,* inhabits Asia and Africa, as well as Europe, and is very abundant in the Dukhun (Deccan). (Sykes, Abbott.)

4th. Sub-family, *Buteonina* (Buzzards).

Beak moderate, hooked from the base. *Tail* equal.

The sub-family of the *Buzzards* agrees, in the opinion of Mr. Vigors, with the last in the length of the wings, and the bill being bent from the base, and differs from it by a weaker and somewhat more elongated bill, by the third or fourth quill-feather being longest, and more particularly by the absence of a tooth on the upper mandible. A gradation seems, however, as Mr. Vigors observes, to soften down these differences, and there is an approximation to the teeth of the falcons in the first genus of the sub-family.

Ictinia (Vieillot).

Beak short. Upper *mandible* subdentated, lower notched. *Tarsi* short and weak. *Acrotarsia* scutellated. *Wings* long. Third *quill* longest.

Mr. Vigors states that this genus is founded upon the *Milan Cresserele* of M. Vieillot, and has a strong and short bill, the upper mandible of which is somewhat angularly festooned, and the under distinctly notched. The *nares* are rounded as in the *Falcons*; the *tarsi* are rather short and feathered below the knees, and the *acrotarsia* scutellated. The wings are of considerable length, extending far beyond the tail; a character which induced M. Vieillot and others to place the bird near the *Kites.* Its strong affinity however to the last sub-family, of which it possesses so many of the characteristics, inclines Mr. Vigors to assign it its present situation. In manners, he adds, it seems also to approach the falcons; and he remarks that if we consider the *Mississippi Kite* of Wilson to belong to the present group of Vieillot, of which Mr. Vigors has little doubt, we must attribute to the bird before us, judging from the interesting description in the *American Ornithology*, much of those

spirited and generous qualities which we admire in the typical groups of the family.

Example, *Ictinia plumbea.* (*Falco plumbeus* of Latham.)

Description.—*Back* and *wings* slate-blue; *head* and *belly* whitish, spotted with brown. *Iris* fine red.

Habits.—Said to fly to a great height, where it remains a long time poised or stationary, and cleaves the air with rapidity in order to seize the great insects which are its prey, independently of reptiles and birds.

Locality, America.



Head and foot of Ictinia plumbea.

Circus (of Authors).

Beak moderate. *Nostrils* sub-oval. *Tarsi* elongated. *Acrotarsia* scutellated. *Toes* generally short. Third *quill* longest. Sides of the *head* furnished with a circle of feathers, very like the capital disk of the *owls*.

This genus, says Mr. Vigors, exhibits still a slight approximation to the last groups in the structure of the upper mandible, which has a rounded protuberance towards the middle, similar to that of the *Hawks*. They are distinguished from the rest of the buzzards by their elevated and slender *tarsi*, which are covered with feathers for some space below the knee, and of which the *acrotarsia* are scutellated. The *nares* are sub-oval and transverse on the cere, and the third quill-feathers are the longest. It includes, according to Mr. Vigors, the European species *F. æruginosus* of Aldrovandus, and *F. pygargus* of Linnæus, to which, he says, may be added, *F. acoli* and *F. melanoleucos* of Daudin, together with some newly described species.

Example, *Circus æruginosus*.

Description.—This is the *Harpaye, Busard Harpaye*, and *Busard de Marais* of the French; *Falco castagnolo* and *Falco con la testa bianca* (young birds), *Falco albanella con il collare* (old), of the Italians; *Schwartz-brauner, Fisch-Geyer mit dem gelben Kopf, Brauner rohr Geyer, Brandweihe, Wasserweihe*, and *Sumpfweihe*, of the Germans; *Moor-Buzzard, Marsh-Harrier, Duck-Hawk, Harpy*, and *White-headed Harpy* of the modern, and *Bod y gwerni*, of the antient British.

Adult Male (third moult).—*Beak* bluish black, with a slight festoon on the cutting edge; *cere* and *irides* yellow; top of the *head, cheeks*, and *nape* of the neck, yellowish white, tinged with rufous and streaked with dark brown; *back, wing-coverts*, and *tertials*, dark reddish brown with lighter margins; *primaries* brownish black; *secondaries* and *tail-feathers* ash-grey.

After the third moult.—*Wing-coverts* and *tertials* become in addition, partially or entirely ash-grey; wing *primaries* slate-grey; *chin* and *throat* nearly white; *breast* rufous, streaked longitudinally with dark brown; *belly, thighs*, and under *tail-coverts* reddish-brown, each feather streaked with dark brown; *legs* long, slender, and yellow; *toes* yellow; *claws* sharp and black.

Second year.—*Head, neck, chin*, and *throat* dull yellow, with an occasional patch of the same colour on the carpus, or anterior point of the wing. (Bewick's figure.)

Young of the year.—All the plumage chocolate brown; feathers tipped with lighter reddish brown; irides darker than in the adult; legs and feet as in old birds. Length from twenty-one to twenty-three inches, depending on the sex. (Yarrell.)

Habits.—*Food.*—*Reproduction.*—The moor-buzzard, when in pursuit of game, flies low, and will, so to speak, beat a moor, or other piece of ground, with the regularity almost of a well-trained pointer. Young rabbits, small quadrupeds, birds, especially water-birds, reptiles, and even fish, are its prey. Sometimes it will sit on the look-out on a stone or low bush. *Nest.*—Generally on the ground, in a tuft of rushes, or coarse grass, or furze, and composed of rushes, or rank grass, and small sticks. Latham says that it will sometimes build its nest in the fork of a large tree, but that the instance is rare. Eggs, three or four, oval, rather pointed at one end, two inches and one line in length, one inch six lines in breadth (Yarrell).

Locality.—Denmark, Norway, Sweden, south of Russia, Germany, France, Holland, Spain, Italy, Turkey. In all countries where there are marshes, very abundant in Holland; rare in the south, migratory in the autumn (Temminck); common in the marshes near Rome, but only young birds, and migratory (Bonaparte); Trebizond (Abbott), Ganges, between Calcutta and Benares, &c. (James Franklin). Europe, India, Africa (Gould). Smyrna (Strickland).

The *Moor Buzzard* may be seen in most parts of England and Wales favourable to its habits. It occurs in Scotland and the Hebrides, and Mr. Thompson notes it as existing in several counties of Ireland from Cork to Antrim.

Mr. Vigors observes that the sub-family of *Buzzards* is that which of all the *Falconidæ* approaches nearest to the family of the owls (*Strigidæ*). In their dull and slothful habits, their heavy flight, and indeed their whole appearance, these contiguous groups evince, he remarks, a general resemblance indicating a corresponding inferiority in the qualities which distinguish the birds of prey. The soft and loose texture of the plumage of both presents a similar affinity, and he adds that *Circus*, in particular, furnishes us with a still further and more intimate point of resemblance. The feathers that cover the cheeks and ears form, as he says, a sort of rounded collar that rises on each side of the face; thus exhibiting a conformity to the disk, or circular erection of the face-feathers so conspicuous in the owls.



Circus Æruginosus.

Speaking of *Circus Cyaneus, Hen Harrier*, Mr. Gould, in noticing the Trebizond collection of birds presented to the Zoological Society by Mr. Keith Abbott, says that European, African, Indian, Chinese, and North American specimens present no specific difference. *Circus cineraceus* he notes as European, Indian, and African. (*Zool. Proc.*,

1834.) In the South African Museum will be found *Circi ranivorus* (with habits very much resembling those of our Moor Buzzard), *Maurus*, *Swainsonii*, and *Le Vaillantii*. In the British Museum there is a very good series of the *Moor Buzzard*, illustrating the different changes of plumage.

Pernis. (Cuvier.)

Beak moderate. *Lore* covered with serrated feathers. *Tarsi* moderate, semi-plumed. *Acrotarsia* reticulated. Third *quill* longest.

Mr. Vigors observes that *Pernis* is distinguished by the singular character of the *lorum*, that surrounds the eye, being covered with feathers, instead of being naked as in the other *Falconidæ*, or furnished only with hairs. In other respects also, he states, the genus differs from that of *Buteo* which follows. Its *acrotarsia* are reticulated, and, like *Circus*, it has the third quill the longest. The *nares* are similar to those of *Buteo*. *Falco apivorus* of Linnæus, the *Honey Buzzard*, and a corresponding species from Java, *F. ptilorhynchus* of Temminck, form, he adds, the typical species of the genus. Example, *Pernis apivorus*.

Description.—The *Honey Buzzard* is *La Bondrée* and *Busé Bondrée* of the French; *Wespen-Busard* of the Germans; *Frosch-geyerl* of Kramer; *Slag-hok* of the 'Fauna Suecica;' *Muse-Haag* and *Muse-Baage* of Brunnich; and *Bod y mel* of the antient British.

Old male.—Space between the eye and the beak covered with small serried feathers. Top of the *head* very pure ashy-blue; upper parts of the body brown, more or less ashy; *secondaries* barred alternately with blackish blue and grey blue; *tail* with three bands of blackish brown, at unequal distances; *throat* yellowish white with brown spots; *neck* and *belly* marked with triangular brown spots on a whitish ground; *cere* deep ash; interior of beak, *iris* and feet yellow. Length about two feet.

Female and young.—Ashy-blue on the forehead only; front of the neck marked with great spots of bright brown; breast and belly yellowish red with deeper spots; under surface of the body often whitish with reddish brown spots.

Young of the year.—*Cere* yellow; *iris* bright brown; *head* spotted with white and brown; under part of the body reddish white with great brown spots; feathers of the upper parts bordered with reddish. (Temminck.)

Habits.—Food.—Reproduction.—The *Honey Buzzard* feeds on field-mice, moles, mice, hamsters, birds, reptiles, wasps and other insects. (Temminck.) 'Examinations,' says Mr. Yarrell in his 'British Birds,' 'have usually proved the food to have been the larvæ of bees and wasps, to obtain which the receptacles containing them are scratched out and broken up in the manner described by Sir William Jardine.* In one instance, in the case of a Honey Buzzard kept in confinement, I was told that it killed and ate rats, as well as birds of considerable size, with great ease and good appetite.' The same author records that the stomach of a specimen killed in the north of Ireland and examined by Mr. Thompson of Belfast, contained a few of the larvæ and some fragments of perfect coleopterous insects; several whitish-coloured hairy caterpillars; the pupæ of a species of butterfly, and also of the six-spot hornet moth. Willughby says, 'In the stomach and guts of that we dissected we found a huge number of green caterpillars of that sort called *Geometræ*, many also of the common green caterpillars and others.' White's specimen had in its stomach limbs of frogs, and many grey snails without shells. Willughby says that it runs very swiftly like a hen. Vieillot states that it seldom flies, except from one tree to another, or from bush to bush, and then always low, and that it runs on the ground with great rapidity like the common fowls. *Nest* on a lofty tree in a wood or forest. White mentions one on a tall slender beech near the middle of Selborne Hanger. Willughby says, 'It builds its nest of small twigs, laying upon them wool, and upon the wool its eggs. We saw one that made use of an old *Kite's* nest to breed in, and that fed its young with the *nymphæ* of wasps; for in the nest we found the combs of wasps' nests, and in the stomachs of the young the limbs and fragments of *Wasp-maggots*. There were in the nest only two young ones, covered with white down, spotted with black. Their feet were of a pale yellow, their bill between the nostrils and the head white. Their craws large, in which were *Lizards*, *Frogs*, &c. In the craw of one of them we found two *Lizards* entire, with their heads lying towards the bird's mouth, as if they sought to creep out.' The same author says that the eggs are cinereous, marked with darker spots. The egg mentioned by White was smaller and not so round as those of the common *Buzzard*, dotted at each end with small red spots, and surrounded in the middle with a broad blood-red zone. Pennant mentions two blotched over with two shades of red, somewhat darker than those of the *Kestrel*. 'The eggs of the Honey Buzzard,' writes Mr. Yarrell, 'are rare: I have only seen three or four specimens, one of which answered to the description given by White, the colouring matter being confined to a broad band round the middle. One specimen in my collection resembles those mentioned by Pennant, being mottled nearly all over with two shades of orange brown: long diameter 2 inches 1 line; transverse diameter 1 inch 9 lines.'

* Address to the members of the [illegible] Club, September, 1835.

Locality. Oriental countries; very rare and accidental in Holland; more abundant in France in the Vosges and in the south, a bird of passage (Temminck). Denmark, Norway, Sweden, Russia, Germany, France, Italy and the south of Europe generally (Yarrell and authors by him quoted). Skins received from India (Gould). In Britain the bird has been obtained in Suffolk, Norfolk, and along the eastern coast as far north as Northumberland, and in several western counties, including Dorsetshire, Devonshire, and Worcestershire. Rare in Cumberland, according to Dr. Heysham, who had only met with one specimen, and was told that it bred in the woods at Lowther. Mr. Thompson mentions one killed in the North of Ireland, and Mr. Macgillivray two as having occurred in Scotland. Buffon and others, Bolon among the rest, say that it gets very fat in winter and is then good eating.



Head and foot of Pernis apivorus.

Buteo (of Authors).

Beak moderate, rather weak. *Nostrils* somewhat rounded. *Tarsi* short. *Acrotarsia* scutellated. Fourth *quill* longest.

Mr. Vigors remarks that the true *Buzzards* are known by their comparatively feeble bill, their short *tarsi*, and scutellated *acrotarsia*. Their *nares* are rounded, and their fourth quill-feather the longest. Their *tarsi* are either plumed to the toes, or half-way covered with feathers. Of those whose *tarsi* are completely feathered, *F. lagopus* of Linnæus is the type, according to Mr. Vigors, and *F.* [illegible] of Daudin appears to approach nearly of those birds whose *tarsi* are but half plumed he gives *Buteo vulgaris*, the *Common Buzzard*, as an example, and remarks that the genus is very numerous in species, and that the birds in it are generally to be observed over the globe.

Description.—*Buteo vulgaris* is the *Falco Buteo* of Linnæus; *Bussard Mauser*; *Falco variegatus* of Gmelin; *F.* [illegible] of Merrem; *La Buse* of the French; *Falco* [illegible]

taone and *Pojana* of the Italians; *Mause Falk* and *Wald Geyer* of the Germans; *Quidfogel* of the 'Fauna Suecica;' *Oerne Falk* of Brunnich; and *Bod teircaill* of the antient British. 'The whole length of the Common Buzzard is from 20 to 22 inches, depending on the sex,—the females, as in the *Falconidæ* generally, being the largest. From the habit of seeking food late in the evening, observed in this species, and also in the Rough-legged Buzzard, and in the softer and more downy texture of the feathers, as compared with the plumage of the true Falcons, the Buzzards are considered as indicating an approach to the Owls. The *beak* is bluish black, darkest in colour towards the point; the *cere* yellow, the *irides* generally yellow; but, as the Common Buzzard and indeed all the Buzzards are subject to considerable variation in the colour of their plumage, the irides are observed to vary also, presenting some reference to the prevailing tone of the colour of the feathers. The upper part of the *head*, *occiput*, and *cheeks*, pale brown, streaked longitudinally with darker brown; the whole of the *back*, *wing-coverts*, upper *tail-coverts* and upper surface of the *tail-feathers* dark clove-brown, the latter barred with lighter brown, the feathers of the former-named parts having lighter-coloured edges; the wing *primaries* brownish black; the *chin* and *throat* almost white; front of the *neck*, *breast*, under *wing-coverts*, *belly*, and *thighs* grayish white, barred transversely with dark wood-brown; *legs* and *toes* yellow; the *claws* black.' (Yarrell.)

Varieties.—Falco albidus, Gmel. *Falco versicolor*, Gmel. *Weisslicher Busard*, Borkh. Deut. Orn. (Temminck.)

Habits—Food—Reproduction.—The flight of the Buzzard is slow, and it generally remains perched on some tree in the wooded districts patiently waiting for its prey, viz. small quadrupeds, birds, and reptiles, and even earth-worms and insects. It may be seen sometimes soaring in circles, but not often, and does not pursue its game but pounces at it when on the ground. Its nature is slothful and cowardly, but its philoprogenitiveness appears to be great. The cock buzzard will hatch and bring up the young if the hen is killed (Ray), and, among other instances, Mr. Yarrell records one of a female buzzard kept in the garden of the Chequers Inn, at Uxbridge, which showing an inclination a few years back to make a nest and sit, was supplied with materials and two hen's eggs, which she hatched and afterwards reared the chicks. Since that time she has hatched and brought up a brood of chickens every year. Once they put down chicks just hatched to her to save her the labour of sitting, but she killed them all. Her family, says Mr. Yarrell, in June, 1831, consisted of nine; the original number were ten, but one had been lost. When flesh was given her she was very assiduous in tearing and offering it as food for her nurslings, and appeared uneasy if, after taking small portions from her, they turned away to pick up grain. ('British Birds,' where there is an elegant vignette of the bird and her foster family.) Indeed the young remain with the old birds some little time after they quit the nest, contrary to the usage of other birds of prey, which generally drive away their young as soon as they can fly. *Nest.*—In Scotland, where the bird is said to be bolder, on rocks or on the edges of steep scars or beds of torrents. (Macgillivray.) In England, the buzzard builds (or sometimes takes to a nest) in the fork of a tree in a wood. The eggs are generally three, sometimes four, short oval, two inches three lines in length by one inch ten lines in breadth, of a soiled white, slightly spotted with pale brown. (Yarrell.)

Locality.—Common in all the wooded countries of Europe; very abundant in Holland. (Temminck.) It is well-known, says Mr. Yarrell, over the wooded parts of the Continent of Europe, south of Russia, and inhabits Spain and Italy, passing over the Mediterranean to North Africa: but Trebizond, Smyrna, and Madeira appear to be its limits to the southward. Prince Bonaparte notes it as very common near Rome. In several parts of Ireland it is common (Thompson); not very plentiful in Scotland, nor does it appear in the lists of the birds of Orkney and Shetland, by the Rev. Mr. Low and Mr. Dunn, though it occurs in Denmark, Norway, Sweden, and Russia. Mr. Gould, in noticing the Trebizond birds presented to the Zool. Soc. by Mr. Keith Abbott, among which it was, observes that it was not previously observed in Asia, although there is a nearly allied species in the Himalaya mountains, and that it had not then been noticed in Africa. (*Zool. Proc.* 1834.) In England, though lately more rare, it is still far from uncommon.

Dr. Richardson ('Fauna Boreali-Americana') states that the Common Buzzard arrives in the fur countries in the middle of April, very soon afterwards begins to build its nest, and, having reared its young, departs about the end of September. It haunts the low alluvial points of land which stretch out under the high banks of a river, and may be observed for a long time motionless on the bough of a tree watching for some small quadruped, bird, or reptile to pass within its reach. As soon as it espies its prey, it glides silently into the air, and, sweeping easily but rapidly down, seizes it in its claws. When disturbed, it makes a short circuit, and soon settles on another perch. One of Dr. Richardson's specimens had two middle-sized toads in its crop. It builds its nest, according to the Doctor, on a tree, of short sticks, lining it with deer's hair. The eggs are, he says, from three to five in number, and he remarks that it was seen by the expedition as far north as the 57th parallel, and that it most probably has a still higher range. He gives a description of two; one a male, shot on the 17th June, at the nest, which contained three eggs, on the plains of the Saskatchewan; and another, a female, killed at the nest also, near Carlton, May 22.



Buteo vulgaris.

Buteo Bacha is recorded by Major James Franklin among the collection formed by him on the banks of the Ganges and in the mountain-chain of Upper Hindostan. In the South African Museum the *Buteones Jackal* and *Tachardus* are preserved. The former obtains its name from uttering a cry somewhat similar to that of the small quadrupeds called *Jackalls* at the Cape. It abounds throughout South Africa. (See the Catalogue.) In the same collection will be found *Butaëtes Lessonii*.

5th Sub-family. *Milvina*. (Kites.)

Beak moderate, rather hooked from the base. *Tail* forked. The length of the wings and the forked tail, instruments of action to which the birds are indebted for their peculiar power and gracefulness of flight, are the characters which more particularly separate the *Kites* from the rest of the *Raptores*.

Elanus. (Savigny.)

Beak moderate, weak, compressed. *Tarsi* short, semi-plumed. *Acrotarsia* reticulated. *Claws*, with the exception of the middle one, rounded internally. Second *quill* longest. First and second *quills* strongly notched internally.

Example, *Elanus melanopterus*. *Black-winged Swallow-Hawk.*

Description.—This is the *Falco melanopterus* of Daudin; *E. cæsius* of Savigny; and *Le Blac* of Le Vaillant. *Size* of a *Sparrow-Hawk*. *Plumage* soft and silky, *tail* a little forked. *Above* ash-coloured, *quills* blackish, *beak* and

shoulders black.' *Below* white. *Tail* principally white. *Feet* yellow.

Habits.—The bird is said to live principally upon insects which it captures on the wing.

Locality.—Common in Africa from Egypt to the Cape. There is a specimen in the South African Museum. Savigny speaks of it as being in great abundance in Syria, Egypt, and Barbary. Cranch (Tuckey's expedition) saw great numbers at the mouth of the Congo, and some were sent home from thence. Lesson says that it occurs in New Holland. It is noticed among the birds collected by Major James Franklin on the banks of the Ganges, and in the mountain chain of Upper [illegible]



Elanus melanopterus.

Nauclerus. (Vigors.)

Beak rather short, weak, compressed. *Nostrils* sub-oval, placed in the *cere*, which is furnished with bristles in an oblique direction. *Wings* long; second or third *quill* longest. *Tail* long, very much forked. *Feet* short, weak. *Tarsi* reticulated. *Acrotarsia* feathered below the knee to the middle. *Claws* not cylindrical. *Body* slender, elegant.

Mr Vigors observes that *Nauclerus* is distinguished from the true *Milvus* by the greater development of the character of the forked tail; by the relative proportion of the wing-feathers, the fourth being the longest in *Milvus*; and by the reticulation of the *acrotarsia*, those of *Milvus* being covered with even scales or scutellated. He divides the genus into two sections.

1st.

With the second quill longest.

Example, *Nauclerus Riocourii.*

2nd.

With the third quill longest.

Example, *Nauclerus Furcatus.* *Falco furcatus*, Linn. *Swallow-tailed Hawk.*

Description.—Whole *length* 20 inches. *Beak* bluish-black, *cere* lighter blue, *irides* dark; *head, neck, breast, belly*, under surface of the *wings, sides* of the body, *thighs*, and under *tail-coverts* pure white; *back, wing-primaries, secondaries*, upper *tail-coverts* and *tail-feathers* black, with a purplish metallic lustre; *tertials* black on the outer webs but patched with pure white on the inner; *tail* very deeply forked; *legs* and *toes* greenish blue; *claws* faded orange. (Yarrell.)

Habits—Food—Reproduction—Locality.—We select Mr. Audubon's account of the habits and locality of this graceful bird:—'A solitary individual of this species has once or twice been seen in Pennsylvania. Farther to the eastward the Swallow-tailed Hawk has never, I believe, been observed. Travelling southward along the Atlantic coast, we find it in Virginia, although in very small numbers. Beyond that state it becomes more abundant. Near the falls of the Ohio a pair had a nest, and reared four young ones in 1820. In the lower parts of Kentucky it begins to become more numerous; but in the states farther to the south, and particularly in parts near the sea, it is abundant. In the large prairies of the Attacapas and Oppellousas 't is extremely common. In the states of Louisiana and Mississippi, where these birds are abundant, they arrive in large companies in the beginning of April, and are heard uttering a sharp plaintive note. At this period I generally remarked that they came from the westward, and have counted upwards of a hundred in the space of an hour, passing over me in a direct easterly course. At that season and in the beginning of September, when they all retire from the United States, they are easily approached when they have alighted, being then apparently fatigued, and busily engaged in preparing themselves for continuing their journey, by dressing and oiling their feathers. At all other times, however, it is extremely difficult to get near them, as they are generally on wing through the day, and at night rest on the higher pines and cypresses, bordering the river bluffs, the lakes, or the swamps of that district of country. They always feed on the wing. In calm and warm weather they soar to an immense height, pursuing the large insects called *Musquito Hawks*, and performing the most singular evolutions that can be conceived, using their tail with an elegance of motion peculiar to themselves. Their principal food however is large grasshoppers, grass-caterpillars, small snakes, lizards, and frogs. They sweep close over the fields, sometimes seeming to alight for a moment to secure a snake, and holding it fast by the neck, carry it off and devour it in the air. When searching for grasshoppers and caterpillars, it is not difficult to approach them under cover of a fence or tree. When one is then killed and falls to the ground, the whole flock come over the dead bird, as if intent upon carrying it off. An excellent opportunity is thus afforded of shooting as many as may be wanted, and I have killed several of these hawks in this manner, firing as fast as I could load my gun. The Swallow-tailed Hawk pairs immediately after its arrival in the southern states; and as its courtships take place on the wing, its motions are then more beautiful than ever. The nest is usually placed on the top branches of the tallest oak or pine tree, situated on the margin of a stream or pond. It resembles that of a carrion crow externally, being formed of dry sticks, intermixed with Spanish moss, and is lined with coarse grasses and a few feathers. The eggs are from four to six, of a greenish white colour, with a few irregular blotches of dark brown at the larger end. The male and female sit alternately, the one feeding the other. The young are at first covered with buff-coloured down. Their next covering exhibits the pure white and black of the old birds, but without any of the glossy purplish tints of the latter. The tail, which at first is but slightly forked, becomes more so in a few weeks, and at the approach of autumn exhibits little differ



Nauclerus furcatus.

ence from that of the adult birds. The plumage is completed the first spring. Only one brood is raised in the season. The species leaves the United States in the beginning of September, moving off in flocks, which are formed immediately after the breeding season is over.'

This species, according to Mr. Nuttall, will, like the *Honey Buzzard*, prey upon locusts and wasps, and their larvæ, and make a regular attack on their nests. M. Vieillot states that it visits Peru and Buenos Ayres. Mr. Yarrell gives it a place among the British birds on the authority of two specimens, one killed at Balachoalist in Argyleshire in 1772, and another taken alive in Shaw-gill, near Hawes in Wensleydale, Yorkshire, in 1805. Apparently to avoid the violence of a tremendous thunder-storm, and the clamorous persecution of a flock of rooks which attacked it at the same instant, it took shelter in a thicket, where it was seized before it could extricate itself, on the 6th September. The person who caught it kept it a month; but a door being accidentally left open, it made its escape. It first alighted on a tree at no great distance, from which it soon ascended in a spiral flight to a great elevation, and then went steadily off in a southerly direction as far as the eye could trace it. (*Linn. Trans.*, vol. xiv.)

Milvus (of Authors).

Beak moderate, weak, subangular above; *nostrils* oblique, elliptical; *tarsi* short; *acrotarsia* scutellated; *wings* very long, fourth quill longest; *tail* forked.

Example, *Milvus ictinus*, *Falco milvus* of Linnæus; *Milvus vulgaris* of Fleming and Gould.

Description.—This is the *Milan Royal* of the French from Belon to Buffon; *Pojana, Milvio, Nicchio*, and *Nibbio* of the Italians; *Rother Milan* of the Germans; *Glenta* of Brunnich; *Glada* of the Fauna Suecica; *Kite, Fork-tailed Kite, Glead* or *Glede* (Pennant says from the Saxon 'Glida') of the modern, and *Barcud* of the antient British. In some of the counties of England it is called the *Puttock*, a name also sometimes bestowed provincially upon the common *Buzzard*. In Essex it is called the *Crotched-tailed Puddock*.



Milvus ictinus.

Length about twenty-six inches; *beak* horn-colour; *cere* and *irides* yellow; feathers of the *head* and *neck* grayish-white, streaked along the shaft with ash-brown; feathers of the *back* and *wing-coverts* dark brown in the centre, broadly edged with rufous; inner web of some of the *tertials* edged with white; *primaries* nearly black; upper *tail-coverts* rufous; *tail-feathers* reddish brown, the outer webs of one uniform colour, the inner webs barred with dark brown; the outer *tail-feather* on each side the darkest in colour; *tail* deeply forked; *chin* and *throat* grayish white, streaked with dusky; *breast, belly*, and *thighs*, rufous brown, each feather with a central longitudinal streak of dark brown; under surface of the *wings*, near the body, rufous, with dark-brown feathers edged with red-brown towards the outer part of the wing; under *tail coverts* plain rufous-white; under surface of the *tail-feathers* grayish-white, with the dark bars of the upper surface showing through; *tarsi* and *toes* yellow; *claws* black (Yarrell) The females are larger than the males.

Habits—Food—Reproduction.—The *Kite* sails gracefully in the air, now describing circles and anon with outspread tail remaining stationary. It pounces on its prey, consisting of moles, mice, leverets, rabbits, unfledged birds, and the young of the Gallinaceous tribe especially. It was, when more plentiful than it is at present, a great scourge to the poultry-yard. It will eat frogs and snakes, and, in the 'Magazine of Natural History,' an observer bears witness to its taking fish from a broad river near which he resided. The *nest*, made of sticks, and lined with soft materials, is usually built on the fork of a tree in a thick wood. The eggs are two, sometimes three, short oval, 2 inches 2 lines in length by 1 inch 9 lines in breadth. They are of a dirty white, with a few reddish-brown spots at the large end. The female lays early in the season, and she often makes a vigorous defence when her nest is attacked.

Locality.—France, Italy, Switzerland, and Germany; less abundant in Russia; more rare in Holland; migratory in autumn. (Temminck.) Very common near Rome, especially near the herds of cattle. (Bonaparte.) It also occurs in Siberia, and the country about Lake Baikal; and has been observed in Egypt, and several parts of Africa north of the equator In Ireland it does not seem to be known. In Britain, especially in the southern counties, it is become rare, though at one time it was evidently abundant. Clusius states, that when he was in London an amazing number of kites flocked there for the offals which were thrown into the streets. They were so tame, that they took their prey in the midst of crowds, and it was forbidden to kill them. In falconry it was used both as pursuer and pursued, and is very docile. A good instance of this docility is given by Mr. Thompson in the 'Magazine of Zoology and Botany,' vol. ii., p. 172. Louis XVI. fled at the kite with powerful falcons; and Sir John Sebright tells us, that 'Fork-tailed kites were much flown some years ago by the earl of Orford, in the neighbourhood of Alconbury Hill. A great owl, to the leg of which the falconers usually tie a fox's brush, not only to impede its flight, but to make it, as they fancy, more attractive, is thrown up to draw down the kite.'

Colonel Sykes notes *Milvus Govinda* as occurring both in South Africa and India. In the catalogue of the South African Museum is the following account of *Milvus parasiticus*, the *Cape Kite*, there preserved. 'This bird is the *Kuicken Deif* or Chicken-stealer of the Dutch colonists, and only appears in South Africa during the summer season. It resorts to inhabited places, and, as its name implies, is very destructive to young chickens. Everywhere it is bold; but it is especially so in districts into which fire-arms have not as yet been introduced, where it will pounce down and seize pieces of flesh from the hands of children, or even grown persons. It feeds in part upon carrion, and many individuals are often seen congregated together upon dead carcasses.'

General Geographical Distribution of the Falconidæ.—Wherever birds and small quadrupeds are to be found there is the bird of prey, whose office it is to keep their number within their proper bounds. Thus, as Mr. Vigors writes (*Zool. Journ.*, vol. i., p. 329—*On the Groups of the Falconidæ*), there seem to be no limits affixed to the geographical distribution of the true *Falcons*. This indeed appears generally the case in the larger groups of this family. The naked-cheeked *Falconidæ* alone seem to be confined to the southern parts of the New World, and to Australia, if we are to refer *F. Novæ Zælandiæ* of Dr. Latham to the genus *Polyborus*, according to M. Temminck's opinion But the remaining groups appear to be dispersed in every division of the globe.

The *Falconidæ* described and figured in Mr. Swainson's 'Birds of Western Africa,' before alluded to, belong to the two most typical or perfect divisions of the family, viz. the noble falcons (*Falconidæ*), and the hawks (*Accipitrinæ*).

Some of the best illustrations of the *Falconidæ* will be found in Audubon, Bewick, Gould, Le Vaillant, Temminck,

Savigny, Swainson, Vieillot, and Yarrell. Some of Frisch's figures are good. There are many fine and expensive works (the 'Planches Enluminées, for example) which contain figures of these noble birds, but they are sadly deficient in character, and look like what they were mostly taken from, ill-stuffed specimens. There is more to be learnt from the wood-cuts of the heads by Swainson in 'Fauna Boreali-Americana' and the 'Classification of Birds,' than from the most gorgeously coloured ill-shaped engraving. The magnificent works of Audubon and Gould are full of the character of the respective species: Swainson particularly excels in this, whether he pourtrays the bird in his beautiful drawings, or gives an epitome of its leading points in the small compass of a wood-cut. The figures in Yarrell's 'British Birds' are excellent, and charming examples of the perfection to which wood engraving can be carried.

Fossil Falconidæ.

Dr. Buckland notices the remains of *Falconidæ* in the 1st period of the Tertiary series (Eocene period of Lyell), and figures a *Buzzard* (*Buteo*), as recent and fossil, in the first plate of his Bridgewater Treatise.

FALCONRY, or HAWKING, the art of training and flying hawks to take other birds. Julius Firmicus, who lived in the middle of the fourth century, is the first Latin writer who speaks of falconers and the art of teaching one species of bird to fly at and catch another. The art, however, had been, in all probability, practised in the East from remote ages; whence it certainly came to Europe.

From the Heptarchy to the time of Charles II. falconry was the principal amusement of our ancestors in England: a person of rank scarcely stirred out without a hawk upon his hand, which, in old illuminations and upon antient seals, is the criterion of nobility. Harold, afterwards king of England, is thus represented in the Bayeux tapestry, when visiting the court of William duke of Normandy.

Florence of Worcester (4to. edit. 1592, p. 310) states that King Alfred had his falconers among the persons whom he encouraged for their skill in different professions; and a metrical treatise on the art of falconry, still extant, is ascribed to King Edward the Confessor.

In 'Domesday Book' the practice of falconry is illustrated by numerous entries. In several places we find a sum, no less than ten pounds, made the optional payment instead of finding a hawk (*Domesd.* tom. i. fol. 134, b. 172, 230); and once, at Worcester (tom. i. 172) a Norway hawk is specified. Aeries, or places destined for the breeding or training of hawks, are entered in the Survey in Buckinghamshire, Gloucestershire, Worcestershire, Herefordshire, Shropshire, and, more frequently than in other counties, in Cheshire; as well as among the lands between the Ribble and the Mersey. (*Ibid.* tom. i. fol. 144, 152, 163 b, 172, 180, 252 b, 256 b, 257, 264, 265, 265 b, 266 b, 267, 267 b, 268 b, 269, 270.)

Nor were hawks less prized at subsequent periods. According to Madox (*Hist. Excheq.* i. 273), in the 14th Hen. II., Walter Cnot, one of the king's tenants, rendered his rent at the exchequer in three hawks and three girfalcons. King John had also his hawks (*Pat.* 4, *Joh.* m. 2); and upon the Patent Roll of the 34th Hen. III. a copy occurs of the letter which the king sent in that year to the king of Norway for hawks. Bray, in the 'History of Surrey,' (vol. iii., p. 82,) relates a curious anecdote of Henry III.'s anger with one Roger Belet, who by reason of something he had done or omitted about a spar-hawk, was disseised of all his lands and 40*s.* rent in Bagshot. In the 34th Edw. III. it was made felony to steal a hawk; to take its eggs, even in a person's own ground, was punishable with imprisonment for a year and a day, besides a fine at the king's pleasure. In Queen Elizabeth's reign the imprisonment was reduced to three months; but the offender was to find security for his good behaviour for seven years, or lie in prison till he did. (Pennant, *Brit. Zool.*, 8vo. Lond. 1812, vol. i., p. 212.)

Edward III., according to Froissart (*Chron.* i., c. 210), had with him in his army, when he invaded France, thirty falconers on horseback, who had charge of his hawks; and every day he either hunted or went to the river for the purpose of hawking, as his fancy inclined him. Queen Elizabeth is represented enjoying this sport in a wood-cut in Turbervile's 'Falconry,' published in 1575; and it was the favourite amusement with King James I.

By an entry upon the Originalia Rolls of the 35th Edw III. (*Origin.*, vol. ii., p. 267) it appears that a falcon gentil cost 20*s.*, a tersil gentil 10*s.*, a tersil lestour 6*s.* 8*d.*, and a lanner 6*s.* 8*d.*: these were the prices which the sheriff was to give for hawks for the king's use. In an account-book of the 20th Hen. VIII. a goshawk and two falcons are prized at 3*l.*, and five falcons and a tersil at 8*l.* Bert in his Address to the Reader, prefixed to his 'Treatise of Hawkes and Hawking,' published in 1619, says he 'had for a Goshawke and a Tarsell a hundred marks.'

Falconry was attempted to be revived by George Earl of Orford, who died in 1791; and in Yorkshire Col. Thornton had a hawking establishment at a rather later period; Sir John Sebright and a few other gentlemen also practised it in Norfolk at the beginning of the present century. As a rural diversion however, principally in consequence of the enclosures, it has gone into disuse.

A list of the hawks which were most used by sportsmen in the time of Charles I. is given in Walton's 'Complete Angler;' and an explanation of the words of art in hawking will be found in Latham's 'Falconry,' 4to., Lond. 1633.

The earliest printed treatise on hawking in English is the 'Book of St. Alban's,' fol., 1481, ascribed to Juliana Barnes or Berners, abbess of Sopwell. [BERNERS.] There are numerous other and curious treatises upon falconry both in French and English, some of them of very rare occurrence. 'Le Miroir de Phebus, avec l'Art de Fauconerie,' published at Paris in 8vo. without date, was the first work upon the subject printed in the French language.

For further information upon Falconry and its practice, the reader may refer to Spelman's *Glossary*, v. 'Acceptor,' edit. fol., Lond., 1626, p. 7; Warton's *Observ. on Spenser's Fairy Queen*, vol. ii., p. 171—173; Strutt's *Sports and Pastimes of the People of England*, 4to., Lond., 1810, pp. 21—33; and Haslewood's *Literary Researches into the History of the Book of St. Alban's*, 4to., Lond., 1810, pp. 21—48 [FALCONIDÆ.]

FALCU'NCULUS. [LANIADÆ.]

FALKIRK, a considerable market, post-town and parish, in Stirlingshire, 24 miles west by north of Edinburgh, and 12 miles south by east of Stirling. The parish is nearly seven miles in length by about four in breadth, and the whole is perfectly level, except that part on which the town stands. It is bounded on the north by the river Carron, which gives name to the celebrated iron works, situated near the fertile tract called the 'Carse of Falkirk.' The town is thriving and increasing in trade and population. It consists of one long street, called High-street, extending about half a mile, and is lighted with gas. It is situated in a wealthy and densely peopled district, in the midst of collieries and manufactories, and is the chief town in the eastern part of Stirlingshire. The extensive suburbs comprise the villages of Lauriston, Grahamstown, Bainsford, and Camelon, together with the seaport town of Grangemouth. These suburbs owe their rise to the great canal passing through them, and to their being in the vicinity of the Carron works, which are only a mile distant from the canal, and which have a railway communication with the basin in Bainsford. The town-house is situated in the middle of High-street, and in this quarter both the houses and shops are large. The new church has a fine steeple 130 feet in height. The old church was a very ancient structure, and built in the form of a cross. According to an inscription that was discovered when taking it down in 1810, it appears to have been founded by Malcolm III. in 1057. In the church-yard were interred Sir John Graham and Sir John Stewart, who were killed at the battle of Falkirk, 22nd July, 1298, while defending the independence of their country under Wallace against Edward I. On each side of the High-street narrow and confined streets branch off, one of which extends upwards of a mile towards Carron, passing through Bainsford and Grahamstown. On the banks of the canal are large corn-mills, a foundry, and a distillery. There are also some extensive tar works in the neighbourhood. The market-day is Thursday, and the trysts or cattle fairs are held three times a year, when black cattle, principally for the English markets, and likewise sheep and horses, are exposed for sale to a very great amount. Indeed this is the largest cattle market in Scotland. The town of Falkirk was formerly a burgh of regality; it afterwards became a burgh of barony, and was held of the family of Livingstone till the attainder,

in 1715, of the earl of Linlithgow and Callander, by whose forfeiture his estates and superiorities became vested in the crown. In 1720 the estate of Callander was purchased by the York Buildings Company, from whom, in 1783, it was acquired by the late William Forbes of Callander, the father of the present occupier. During the time the estate was held by the York Buildings Company there was always a resident baron-bailie; and Mr. Forbes continued to name a person to that office till about the end of the last century. Since then the office has been vacant.

The management of the affairs of the town and community is at present vested in two separate bodies, the stent-masters and committee of feuars. The stent-masters are elected annually, and are twenty-four in number; four being chosen by the merchants, two by each of the trades or guilds of hammermen, wrights, weavers, shoemakers, masons, tailors, bakers and brewers, and four from the suburbs of the town. Any person belonging to any of these trades is qualified to vote for and to be elected a stent-master of his craft. By the act 3 and 4 William IV., c. 77, the town of Falkirk obtained a municipal constitution. The council consists of a provost, three bailies, a treasurer, and seven councillors. According to the population returns for 1831 the burgh and parish of Falkirk contained 12,743 persons. It returns a member to parliament in union with the burghs of Lanark, Linlithgow, Hamilton, and Airdrie. The debt of the town is 1700*l.*, its revenue about 200*l.*, and annual expenditure 174*l.* The patronage is in the crown. Near Falkirk the Pretender gained a victory over the royal army on the 17th of January, 1746. Here also is a part of the Roman wall, known by the name of 'Graham's Dyke,' built in the time of the Emperor Antoninus Pius. The grammar and English schools of Falkirk are in high repute: they are all private except the parish one, the master of which is appointed by the heritors. (Playfair's *Description of Scotland; Sinclair's Statistical Account of Scotland; Boundary Reports; Municipal Corporation Reports*, 1835; *Population Returns.*)

FALKLAND, HENRY CARY, VISCOUNT, descended from the Carys of Cockington, was the son of Sir Edward Cary of Berkhamsted and Aldenham in Hertfordshire, at which latter place he was born late in the reign of Queen Elizabeth. When about sixteen years of age, he was sent to Exeter College, Oxford; but he left that university without taking a degree. In 1608 he was made one of the Knights of the Bath, at the creation of Henry, Prince of Wales; and in 1617 was sworn in Comptroller of his Majesty's household, and made one of his privy council. On the 10th November, 1620, he was created Viscount of Falkland, in the county of Fife, in Scotland. King James I., knowing his abilities and experience, constituted him Lord Deputy of Ireland, into which office he was sworn September 18th, 1622, and continued in it till 1629. During his administration he is said to have kept a strict hand over the Roman Catholics in that kingdom, which gave them occasion to send complaints to the court of England against him, till, by their clamour and prevailing power, he was removed in disgrace. Leland in his 'History of Ireland,' has given the character of his government. 'Lord Falkland,' he says, 'seems to have been more distinguished by his rectitude than abilities. In a government which required vigour and austerity, he was indolent and gentle; courting rather than terrifying the factious. He was harassed by the intrigues and clamours of the king's ministers, whom he could not always gratify to the full extent of their desires; his actions were severely maligned at the court of England; his administration in consequence was cautious and embarrassed. Such a governor was little qualified to awe the numerous and powerful body of recusants, relying on their merits, and stimulated by their ecclesiastics to the most imprudent excesses.' Lord Falkland returned and lived in honour and esteem till 1633, in which year, in the month of September, he died, in consequence of having broken one of his legs by an accident in Theobald's Park. Wood includes Lord Falkland among the Oxford writers. The only work of his which was published was a *History of the most unfortunate Prince Edward II.*, edited by Sir James Harrington, in folio and octavo, in 1680. One of his letters is printed in the 'Cabala,' and three or four others remain unpublished in the Harleian Collection of Manuscripts in the British Museum. Lord Orford says he was remarkable for an invention to prevent his name being counterfeited, by artfully concealing in it the successive years of his age, and by that means, detecting a man who had not observed so nice a particularity. (*Biogr. Brit.*, Kippis's edit., vol. iii., p. 290; Leland's *Hist. of Irel.*, vol. ii., p. 474; Park's edit. of Lord Orford's *Royal and Noble Authors*, vol. v., p. 65.)

FALKLAND ISLANDS, The, are a group of islands situated in the southern Atlantic Ocean, between 51° 40′ and 52° 10′ S. lat., and 57° 30′ and 60° W. long. There are two larger islands, called East and West Falkland, and a number of smaller ones, which it is said amount to more than 90. The strait which separates the larger islands is called Falkland or Carlisle Strait, and is from six to ten miles wide. The surface of both islands is calculated to be about 3400 square miles, or about 1000 miles more than that of Devonshire. The northern districts in both islands are rather mountainous, but the highest ground does not much exceed 2000 feet above the sea-level. At the foot of the mountains the plains stretch from five to fifteen miles along the margin of the sea; the southern districts are more level, and hardly contain a hill. The whole coast, especially in the northern districts, is much indented, and contains numerous excellent harbours; among which the most frequented are Berkeley Sound on West Falkland and Port Egmont on East Falkland: both these bays are spacious, of sufficient depth for men-of-war, and have excellent anchoring ground. The climate of these islands does not differ much from that of the British islands. The range of the thermometer is between 26° and 75°; in winter between 26° and 50°, and in summer between 50° and 75°. The weather is rather unsettled. The snow disappears in a few hours, except on the tops of the mountains, and the ice is seldom above an inch thick. Fogs are frequent, especially in autumn and spring, but they usually disappear towards noon. The vegetation is very rapid.

No trees grow on the islands, but wood for building may easily be obtained from the Strait of Magalhaens. Peat and some bushes, which are abundant, supply fuel. Several antiscorbutic plants grow in abundance. The islands contain foxes, but they differ from those of Europe, having a thick head and a coarse fur. Seals are found on the rocks close to the islands. Many black whales are caught in the neighbouring seas. A kind of fish, between the mullet and the salmon, is very abundant, especially in spring. Game is extremely common, especially wild geese and ducks, which are easily tamed. The flocks of gulls and penguins which visit these shores are valuable on account of their eggs.

The Europeans who settled in these islands about the middle of the last century brought with them domestic animals: on their settlements being broken up, the animals remained, and some of them thrive well. There are herds of wild horned cattle and of wild hogs; the horses are of small size, but very hardy, and may be broken in, though with some difficulty. Rabbits are very numerous, of a large size, and have a fine fur.

The soil, especially along the base of the mountains and hills, is well adapted to cultivation, consisting generally of from six to eight inches of black vegetable mould. Wheat and flax have been raised, and potatoes, cabbages, turnips, and other kinds of vegetables, largely and of excellent quality. As to other kinds of produce, the capabilities of the soil have not yet been ascertained. It is probable that even fruit-trees will succeed in sheltered places.

These islands were discovered in 1594 by Hawkins, who called them Hawkins' Maiden Islands, and afterwards again in 1689 by Strong, who gave them the name which they now bear. A French vessel from St. Malo landed here in 1710, and named them Isles Malouines. The French formed a settlement in 1764 on Berkeley Sound which they called St. Louis, but it was given up to the Spaniards in 1767, and some time after abandoned. The English settled in Port Egmont in 1765, but after a few years they were expelled by the Spaniards. A negotiation followed, by which the English recovered possession of the settlement. On this occasion Dr. Johnson wrote a pamphlet about the islands in answer to one of the letters of Junius, in which he depreciated their value as much as Junius had exaggerated it. The English kept possession of this place up to 1774, when it was also abandoned. But when, about the beginning of the present century, the whale-fishery in the seas surrounding the antarctic pole began to become important, these islands again attracted attention, and this interest was still further increased when the commerce with the western coast of

South America was opened to all nations by the navigation round Cape Horn. The English again formed a small settlement in Port Egmont in 1817, principally as a place of refreshment for the whalers. Berkeley Sound, which is better situated for vessels bound round Cape Horn, was settled by a small colony sent there from Buenos Ayres in 1832, but the English government took possession of it soon afterwards. [*London Geog. Journ.*, III. and VI.]

FALL OF BODIES. Under this head we propose simply to explain the laws which regulate the fall of a material substance, supposed either to be allowed to drop or to be projected directly upwards or downwards. The motion of a body projected in an oblique or horizontal direction comes under PROJECTILES, THEORY OF; the nature of the forces which cause the descent or retard the ascent, under ACCELERATION, GRAVITY, &c.; and the circumstances which influence more or less the results about to be specified, under PROJECTILES, RESISTANCES, MOTION OF THE EARTH; MOTION, LAWS OF.

The resistance of the air does not greatly affect the motion of bodies, unless either—1, the bodies themselves be very light, as in the case of feathers, or—2, the velocities be very great, as in that of a cannon-ball. The law according to which this resistance acts is not well ascertained for great velocities; but for moderate velocities it is not far from the truth to say that it is as the square of the velocity: that is to say, whatever resistance there may be to a velocity of 10 feet per second, there is *four* times as much to 20 feet per second, *nine* times as much to 30 feet per second, and so on.

Neglecting the resistance of the air, let us first suppose a body (say a bullet) to be allowed to drop from a height above the earth. The law of its motion is as follows. It acquires velocity uniformly at the rate of $32\frac{1}{6}$ feet per second: that is, at the end of a quarter of a second it is in such motion as would, were the action of the earth to cease, cause it to describe $8\frac{1}{24}$ feet in a second. At the end of one second the rate of motion is $32\frac{1}{6}$ feet per second; at the end of two seconds, $64\frac{1}{3}$ per second, and so on: that is, the fall of a body is a uniformly ACCELERATED MOTION. In the article just cited the law of this motion is further explained. We shall here collect the principal formulæ connected with the subject, referring to PENDULUM and ATWOOD'S MACHINE, for the manner in which the main fact of the acceleration being $32\frac{1}{6}$ per second is proved and verified.

Let $g = 32\frac{1}{6}$

t = the number of seconds during which the motion has lasted when the body has attained a velocity of v feet per second, and described a length of s feet.

Firstly, suppose the bullet simply to drop without any initial impulse being communicated. Then

$$v = g\,t, \qquad s = \tfrac{1}{2}g\,t^2 = \tfrac{1}{2}v\,t, \qquad v^2 = 2\,g\,s.$$

Thus, either of the three, v, t, s, being given, the others may be found.

Secondly, suppose the bullet to be projected downwards with a velocity of a feet per second; the consequence is still a uniform addition of g feet per second to the velocity, and we have

$$v = a + g\,t, \qquad s = a\,t + \tfrac{1}{2}g\,t^2, \qquad v^2 - a^2 = 2\,g\,s.$$

Thirdly, suppose the bullet to be projected upwards with a velocity of a feet per second. The action of the earth begins by producing a loss of velocity at the rate of $32\frac{1}{6}$ feet lost per second. This lasts until the velocity of the bullet is entirely destroyed, after which it begins to descend without any initial impulse, and we have the first case repeated.

During the ascent,

$$v = a - g\,t, \qquad s = a\,t - \tfrac{1}{2}g\,t^2, \qquad a^2 - v^2 = 2\,g\,s,$$

and the height through which the bullet will ascend is $a^2 \div 2\,g$ feet, the time of doing which is $a \div g$ seconds. After this the first case may be repeated: but this is not necessary; for the preceding equations will continue to represent the relations which actually exist, provided that v, becoming negative, be interpreted as indicating that the turn has taken place and the bullet has begun its descent, and also that s becoming negative be interpreted to mean that the descent has continued until the bullet has passed through the point from which it was first thrown, and fallen below it. For instance (supposing $g = 32$ for simplicity), let a bullet be projected *upwards* with a velocity of 100 feet per second, where will it be, and at what rate will it be moving, at the end of ten seconds?

$v = 100 - 32 \times 10 = -220$, or the bullet is moving *downwards* at the rate of 220 feet per second.

$s = 100 \times 10 - \frac{1}{2} \times 32 \times 10^2 = -600$, or the bullet is 600 feet below the point from which it was thrown upwards.

FALLACY, as defined by Archbishop Whately, is any unsound mode of arguing which appears to carry conviction and to be decisive of the question in hand, when in fairness it is not. Bentham's definition in his 'Book of Fallacies' is this: 'By the name of fallacy it is common to designate any argument employed, or topic suggested, for the purpose, or with a probability, of producing the effect of deception,—of causing some erroneous opinion to be entertained by any person to whose mind such argument may have been presented.' Accordingly if an argument be undesignedly vicious, and without any attempt at deception, it is more correctly termed a paralogism, and it is the intention of fraud that constitutes the fallacy or sophism. There is, however, a legitimate use of fallacy which is too often unnoticed by writers on logic. Thus in modern times Kant has employed the dilemma for a purely scientific purpose; and from the impossibility of two opposite and conflicting cases, has inferred, not as is the usual deduction, that the hypothesis upon which they both rest is false and untenable, but that the truth is intermediate. In like manner did Zeno of Elea infer the inadequacy of sense to represent the truth, from his conclusion that either a bushel of corn must make no noise in falling or else the fall of the smallest portion of a single grain must be perceptible to the ear. Again, the famous 'Megarian fallacies of the Heap and the Bald-head' (acervus calvus), in which it is proved that these notions are incapable of any precise determination, may have been designed to show that the distinctions of degree (here represented by Heap and Bald-head) are unavailable for philosophical purposes, and thereby to call attention to the difficulty of admitting into science the vague representations of sense.

Aristotle in his treatise 'De Sophisticis Elenchis' has laboured to expose and classify the different fallacies which he terms *sophismata* (σοφίσματα). He divides them into those *extra dictionem* (ἔξω τῆς λέξεως) where the fallacy is in the process of reasoning, and those *in dictione* (παρὰ τὴν λέξιν) where it lies in the subject-matter. The former have by the schoolmen been called formal, the latter material. Dr Whately proposes the terms logical and non-logical; which terminology has at least the advantage in a scientific point of view that it excludes from the domain of logic much that is extraneous to it: for the fallacies of form may be reduced to the syllogism with four terms which the analytical process of demonstration can alone discover, whereas those of the matter must be corrected by the formation of valid principles and a correct generalization of terms, which belong to the synthesis of induction, which is totally alien from logic as the science of demonstrative reasoning.

For an enumeration and exposition of the several sophisms see the sections on fallacy in Whately's *Logic;* and for the exposure of that class of fallacies which he has called political fallacies, the work of Bentham already cited, 8vo., London, 1824.

FALLING STARS. [AEROLITES.]

FALLOPIAN TUBES. The Fallopian tubes, so called from the anatomist who first accurately described them, are tortuous and slender membranous canals about three inches in length, which proceed on each side from the two upper corners of the flattened triangular or pear-shaped body of the uterus. They communicate with its cavity by minute openings capable of admitting a large bristle. As they diverge outwards from their origin, they enlarge, and, curving backwards, terminate obliquely in open fringed extremities directed towards the ovaries, which lie below and somewhat behind them. They are included, as are likewise the ovaries, in the duplicature of the peritoneal lining of the abdomen, called the broad ligaments of the uterus, by which that body is itself invested and attached laterally to the cavity of the pelvis. A production of this membrane sheathes them to their loose trumpet-shaped extremities, and turning over the edge is continued for some distance up the interior surface, finally blending with the mucous lining which accompanies them in their exit from the uterus. This is the only instance in the body of the continuity of a serous and mucous membrane, and probably has some concern in the spreading of inflammation from the interior of the uterus to the peritoneum, which constitutes one of the forms of puerperal fever

Before the period of conception these tubes are observed in the lower animals to become more full of blood, and to have a writhing peristaltic motion like that which impels the aliment along the intestinal canal. Certain prominences are also observed at this time on the surface of the ovaries, produced by the maturation and swelling of the *Graafian vesicles*, which are the ova or germs of the future progeny. The Fallopian tubes then become attached by their open fimbriated mouths over these prominences; and receiving the vesicles as they burst through the peritoneal covering of the ovaries, convey them by the peristaltic motion we have mentioned into the uterus.

Whether these germs are always fecundated before they reach their destination is disputed. Such is unquestionably the fact in what is called extra-uterine conception. In these cases the germ never reaches the uterus at all, but remains in the intermediate canal and becomes attached to its surface; in this position it may attain its full size, expanding the tube as it grows, till at length it gives way, and the fœtus escapes into the general cavity of the abdomen Such cases are not necessarily fatal; the fœtus, dead of course, sometimes becomes enclosed after a certain period in a membranous cyst, gradually extended around it from the parietes of the abdomen; and may remain for many years without exciting much irritation. In other instances abscesses form and break in succession, discharging the bones and other unabsorbed parts of the fœtus, and the case eventually does well. But such results are rare; and nothing but the cæsarean operation affords much prospect of saving life.

FALLOPPIO, GABRIELLO, or FALLOPIUS, was born at Modena about the year 1523. He was one of the three distinguished anatomists of the sixteenth century, to whom Cuvier, an unquestionable authority on such subjects, has assigned the merit of restoring, or rather creating their science in its modern and exact form. His associates in this award of praise are Vesalius and Eustachius, the former of whom he succeeded in the united professorships of anatomy and surgery at Padua in 1551. The latter taught at Rome during the same period with less success and perhaps more ability, and their writings indicate some mutual jealousy. [EUSTACHIUS.]

Fallopius appears at one time to have held an ecclesiastical appointment in the cathedral at Modena, which he resigned to devote himself to more congenial pursuits. Having gratified his curiosity by travelling through the most interesting parts of Europe, he settled for a time as a public teacher of anatomy at Ferrara, where he had received a medical education. But he soon quitted that university, which was, in fact, a sphere too narrow for his talents; and had lectured at Pisa for some years with increasing reputation under the patronage of the first Grand Duke of Tuscany [COSMO I.], when he was induced by the liberal proffers of the Venetian senate to repair to Padua to take the place of Vesalius, who had been obliged to resign his academic offices by one of the disastrous incidents which have thrown a romantic interest over the latter part of his remarkable life. [VESALIUS.]

The studies of Fallopius were by no means confined to one department of natural history. He appears to have occupied himself among the rest with the subject of systematic botany, which had very recently begun to attract attention. In this, as in all other steps in the revival of learning, Italy took the lead. The first botanic garden had been established at Pisa by Cosmo de' Medici in 1543, and was at this time under the management of Cæsalpinus. [BOTANY.] The second was established two years later at Padua; and the charge of this garden, with the professorial duties annexed to it, was committed to Fallopius soon after his arrival in that university. The botanical researches and collections he had made during his travels, and his subsequent opportunities at Pisa of access to the best sources of contemporary information, had probably fitted him in no common degree to undertake this additional charge, which he is said to have sustained with great ability and applause. He did not write, and we are not aware that he lectured expressly on the subject of botany as a system; but there are many allusions to it in his works, and among them are several treatises on the preparation and use of various medicinal herbs, as well as of the mineral substances employed in pharmacy.

In addition to his merit as a naturalist and a teacher, Fallopius was an excellent and expeditious operator, and otherwise, for his time, a good practical surgeon. His character with posterity in this respect is somewhat tainted by the appearance of a degree of quackery in the concealment of his remedies, and a trumpeting forth of their virtues which his experience of them could not have justified. But our own age is not so free from the like professional sins, or from the credulity which tempts to their commission, as to make it a matter of surprise that such things were consistent three centuries ago with the high reputation of Fallopius.

After a short but brilliant career of eleven years both in practice and as a teacher, he died at Padua in 1562, and was succeeded by his favourite pupil Fabricius ab Aquapendente.

The only work certainly known to have been revised by himself was a volume entitled 'Anatomical Observations.' It was first printed in 8vo. at Venice, in the year before his death, and has been frequently reprinted. The publication of this work forms an epoch in the science of human anatomy. There is no part of the frame with which the author does not display a masterly acquaintance. Many important parts of it he was the first to describe, if not to observe; and several of them still bear his name. His lectures on pharmacy, surgery, and anatomy were published after his death in various forms and with very different degrees of fidelity by his pupils. The best of them were collected and published with his 'Observations' in three volumes folio, Venice, 1584, and have passed through several editions. They are now superseded by more complete and systematic treatises, and are seldom consulted but by antiquarians in medical literature, or to support novel opinions; for in these sciences, as in others, much that is *new* is likewise old.

FALLOW is a portion of land in which no seed is sown for a whole year, in order that the soil may be left exposed to the influence of the atmosphere, the weeds destroyed by repeated ploughings and harrowings, and the fertility improved at a less expense of manure than it would be if a crop had been raised upon it.

The practice of fallowing land is as old as the Roman Empire. It appears that wherever the Romans extended their conquests and planted colonies, they introduced this mode of restoring land to a certain degree of fertility when exhausted by bearing grain. The principle on which it was recommended was however erroneous. It was thought that the land grew tired of raising vegetable produce and required rest, and hence this rest was often all that constituted the fallow, the tillage, which alone is the improving part of the process, being almost entirely neglected. Where land was abundant and the population thin, it was no great loss to allow a considerable portion of the soil to remain unproductive; and it was cheaper to let land lie fallow during the course of a whole year, which gave ample leisure for every operation, than to accelerate the tillage and increase the manure put upon it. But when land becomes of greater value with the increase of population, it is a serious loss if a great portion of the soil be thus left in an unproductive state. Accordingly the attention of agriculturists has been turned to lessen the necessity of fallows, and to substitute some other means of restoring fertility. It is acknowledged by all experienced farmers that manure alone is not sufficient for this purpose. The ground must be tilled and noxious weeds destroyed; and the only efficacious mode of doing so is to stir the ground at the time when their seeds have vegetated, their roots have made shoots, and before any new seed can ripen. But this is exactly the time when corn is usually growing, and when the land cannot be stirred to expose it to the heat of the sun and to dry the roots which are turned up. The only apparent remedy is therefore not to sow it during one summer, and on this principle lands are usually fallowed. The manner in which this is done has been noticed before [ARABLE LAND]; and the common process is so simple, that provided the purpose of fallowing be kept in view, the operations require only a little attention to time and weather to be performed aright.

There is no difference of opinion respecting the manner of extirpating weeds by repeated ploughing and harrowing, but there is with respect to the influence of the heat of the sun upon the land. Some men are of opinion that light is the great purifier of the soil; that it decomposes certain noxious particles, which are the result of the formation of the seed, and which have been termed the excrements of plants. Physiologists agree that the roots draw the nutritive juices out of the soil, that they undergo a chemical change in the plant, and that there is an exudation also

from the roots, which may be looked upon as the residuum of the natural process. De Candolle, Raspail, and other eminent physiologists have placed this point beyond controversy; but no one has yet been able to collect these matters so as to analyze and compare them; and the reasonings on the subject have been merely conjectural. In particular soils and situations a scorching sun has a pernicious effect on the soil which is exposed to his rays; and where it is shaded by a crop which covers it completely, it seems to have acquired fertility, which the exposed surface has not. But this is not sufficient to establish a general rule. Some soils which are of a wet nature are greatly improved by being as it were baked in a hot sun. Not only are the weeds destroyed by the abstraction of moisture, but the soil thus becomes lighter and more friable. On sandy soils the reverse is the case, and on intermediate loams the effect will be more or less advantageous as they approach nearer to the clay or to the sand. In light sandy soils, then, it is probable that the only advantage of a naked fallow is to kill weeds, especially the couch-grass (*triticum ripens*), which is apt to infest light soils; and that the exposure to the sun in hot weather is not only no advantage, but probably detrimental. If, then, any means can be devised of clearing light lands from weeds without leaving them fallow for a whole summer, a great advantage will be obtained. This has been effected completely by the cultivation of turnips and clover, which was first practised in the light soils of Flanders, and afterwards introduced into the similar soils of Norfolk, from whence it has spread all over Great Britain, and is beginning to be adopted more generally in Ireland. The advantage of the turnip culture is so great in light lands, that it has gradually been extended through the different gradations of loams, till it has reached even the colder and stiffer clays, on which it would at one time have been thought absurd to attempt to raise this root. But this has been attended with an important benefit. It has made the cultivators of heavy soils turn their attention to the drying of their lands, by draining and deep tillage, in order to make them capable of bearing turnips; and although the extended culture of this useful root is not what we should recommend for cold wet clays, we highly approve of all improvements which will make such lands capable of bearing good crops of turnips. Unless the turnips can be consumed by sheep on the spot, or by cattle near at hand, without injuring the land in taking off the turnips and carting on the manure, there will be no great advantage in a crop of turnips; and some other substitute must be found for the occasional fallow before it can be altogether abandoned. On light lands the preparation for the turnips, the abundant manuring, and subsequent hoeing are as effectual in cleaning the land and bringing it into a fertile state as any complete fallow could ever be; and the clover smothers and destroys the seed weeds which may have come up amongst the barley or oats sown after the turnips. There are several ways in which the cultivation of light soils may be varied without adhering strictly to the Norfolk rotation, so as to introduce a greater variety of produce. Tares may be sown on the better sorts of light lands after a good tillage given immediately after harvest. If they are fed off or cut green in May and June, early turnips may be sown after them, which will be fit to feed off or draw for the cows in September; in good time for ploughing up the land for wheat-sowing. In this case the land gets all the ploughing necessary to clean it completely, and exactly at the best time. Three ploughings may be given after the tares if the land is not clean, and the turnips being well hand-hoed and horse-hoed, the land will be perfectly clean to receive the wheat-seed. Manure may be put on for the tares or the turnips; and if these are fed off with sheep, they will so enrich the soil, that the next crop cannot fail to be abundant. By varying the management of light land according to circumstances, and with some judgment, many more profitable crops can be raised than by the common simple rotation, in which a fourth of the land is sown with turnips. If this crop fails, which is often the case where it recurs so often, the whole system is deranged, and the loss is very great. The introduction of a greater variety of produce in the cultivation of light lands, in imitation of the Flemish practice, and the increase of stock kept in consequence, would be an important step in the improvement of British husbandry.

On heavy soils it is often impossible to keep the land clear of weeds, in wet climates and unfavourable seasons, without a complete fallow, and when this is the case it is best to do the thing effectually. Upon cold wet soils, which should always first of all be well under-drained, no pains should be spared to get the land perfectly clean: it should be exposed to the frosts of two winters and the heat of one summer and part of another, as already mentioned. [ARABLE LAND.] Only one crop is lost by this method, and if the land is properly worked, cleaned, and manured in autumn, it may be sown with barley or oats in the spring of the second year. The crop will be ample, and the subsequent produce of clover equally so, and the land so clean, that, with proper manuring, several crops may succeed, such as wheat, beans, oats, tares, wheat, without the necessity of another intervening fallow. The advice we would impress on the minds of the cultivators is—Avoid fallows if you can keep your land clean; but when you fallow, do it effectually, and improve the soil at the same time by chalk, lime or marl, according to circumstances. Do not spare either ploughs or harrows in dry weather. Lay the stitches high and dry before winter, and deepen the water-furrows well with the spade. By following these rules the stiffest land may be brought into a good state of cultivation; and the farmer will not find by the growth of weeds, docks, and thistles, that his labour and manure are thrown away, as is too often the case. Experience has fully proved that the air and the dews impart fertility to the soil, and that land which has been well fallowed and stirred requires less manure than it would otherwise do. Fallowing alone will not make up for want of manure, nor will manuring be sufficient without ploughing and cleaning the land properly, and exposing it to the influence of the atmosphere, especially in autumn and in spring: but a great saving of the one and the other may be effected, by judiciously varying the crops so as to admit of ploughing the land at different seasons of the year.

It is asserted by some old-fashioned farmers that the plough alone is sufficient for all the purposes of fallowing. This is a great error, which leads to useless and unnecessary labour. We would almost say that ploughing the fallows is never necessary, except to enable the drags and harrows to stir the land. The first ploughing of the stubble cannot be too shallow, and the harrows should be set to work before the wet weather sets in. When the surface is become mellow and clean, the land may be ploughed deep, and the soil below should be brought up and exposed to the air and frost all the winter. In spring the drag should begin the work again before the soil is hard. It may then be ploughed in narrow ridges right across the old stitches, or obliquely, and left for the influence of summer. The drags will level all these ridges when the manure is to be put on; and this being ploughed the land is fit to receive the seed, if wheat is the crop intended. If it is left for barley, it must have another ploughing in spring, and be well harrowed before the seed is sown, especially if this is done by the drilling machine. The clover or grass-seeds may be sown immediately after, and the land lightly rolled. There is no danger of making it too fine in spring. Without a fine tilth no good barley can be expected.

FALMOUTH, a parish, borough, market, and seaport town in the county of Cornwall, in the hundred of Kerrier, 54 miles south-west from Launceston and 267 miles west-south-west from London, in 50° 8′ N. lat. 5° 3′ W long. The town is situated at the mouth of the river Fal, whence it derives its name, and consists principally of one street, which extends along the south-western shore of the harbour for about a mile. There is a convenient quay, a town-house, and gaol erected in 1831. The water near the quay is of sufficient depth to allow vessels of considerable burthen to discharge their cargoes on the wharf. Adjoining the principal street and near the centre of it stand the market-house and town-hall. The Public Rooms, a handsome building, is situate in the heart of the town; and not far from it is the polytechnic hall, a spacious and commodious structure, in which are held the annual exhibitions of the Royal Cornwall Polytechnic Society, an institution which, though only established in the year 1833, has always contributed much to promote emulation in the fine and useful arts among all classes throughout the county. The church, which has a handsome altar, was built soon after the Restoration, and dedicated to Charles the Martyr. The average net income of the living is about 300*l*. It is in the diocese of Exeter, and the patron is Lord Wodehouse. There are also places of worship for Baptists, Bryanites, the Society of Friends, Wesleyan Methodists, and Unitarians, a Roman Catholic chapel, and Jews' synagogue, and likewise several schools and numerous cha-

ritable institutions. On the whole Falmouth is a neat and tolerably well-built town. It is lighted with gas, and contains two good hotels. The suburbs are adorned with several villas, which, together with the harbour, when seen from the surrounding hills, have a very beautiful appearance.

The charter of incorporation bears date 13 Charles II. The governing body, under the Act 5 and 6 William IV., c. 76, consists of a mayor, four aldermen, and twelve councillors. The corporation has no revenue whatever; the tolls of the market and the quay are the property of Lord Wodehouse. The only police are the constables appointed by the town councils, these and other expenses being paid by a rate. According to the returns made in 1831 the population of the town and parish of Falmouth was 7284, of which the town alone contained 4761. Falmouth is a parliamentary borough, and in union with Penryn returns two members. The market-days are Tuesday, Thursday, and Saturday, and the fairs are held the 7th August and 10th October.

The harbour, which is extensive and well protected by the surrounding high lands, is so conveniently situated that vessels have frequently been able to proceed on their voyage from this port, while those from Plymouth and Portsmouth have been forced back by contrary winds before they could reach the mouth of the Channel. It is defended by two castles; one, towards the west, called Pendennis, and the other, towards the east, called St. Mawes. Carew, in his 'Survey of Cornwall' (London, 1602) states that both these castles were built by Henry VIII., and subsequently improved and strengthened by Queen Elizabeth. Pendennis long resisted the attacks of Oliver Cromwell, whose lines of encampment may yet be seen. It now contains commodious barracks, storehouses, and magazines, with apartments for the lieutenant-governor. A light-house has recently been erected at St. Anthony's Point, at the east side of the harbour. The Trinity Board have recently directed the building of an obelisk on the height of the Black Rock, between Pendennis and St. Mawes, for the assistance of mariners in making Falmouth harbour. Formerly there was an extensive fishery in pilchards, and large quantities were annually exported. It has been stated that of late years this fish has become particularly scarce, though from the account given by Mr. M'Culloch of the present state of the fishery on the coast of Cornwall, there appears to be little or rather no foundation for such an assertion. The exports consist principally of the produce of the tin and copper mines: the trade with Jersey in fruit and cyder is considerable. The port is first spoken of in the reign of Henry IV., when the duchess dowager of Bretagne landed here, in progress to celebrate her nuptials with that king. Until 1613 the site of the present town was occupied merely by the huts of fishermen. There was however one house of entertainment, at which Sir Walter Raleigh and his crew put up on their return from Guiana. Shortly after this period Sir John Killegrew, bart., an enterprising individual, having obtained permission from James I., constructed a new quay, laid the foundation of the present town, and procured an act of parliament, by which the payment of certain duties was secured to himself and heirs. The subsequent establishment, about 1688, of the post-office packets to the West Indies, Lisbon, &c., contributed much to the rising prosperity of the place. In 1700 there were 350 houses, in 1750 upwards of 500, and in 1811 there were 647 inhabited houses in the town and suburbs. Large amounts of specie and bullion are landed from the packets arriving from Spain, Portugal, and America. The steamers which run between London and the Mediterranean invariably call here on their outward and homeward passage to take in passengers and coals; and the Peninsula Steam Navigation Company, having recently contracted with government to carry the mail, one of their powerful vessels now leaves the port every Monday. This alteration in the conveyance of the mail had long been felt necessary by merchants connected with the Peninsula. About the middle of the entrance to the harbour is a large rock called the Black Rock, which is traditionally said to have been the island where the Phœnicians trafficked with the natives for tin. Borlase, in his 'Antiquities of the County of Cornwall,' mentions the finding of a large quantity of Roman coins on a branch of Falmouth harbour, nearly the whole of which were of the coinage of the Emperors Gallienus, Carinus, and Numerian, who reigned A.D. 259—284. At the western extremity of the town stands Arwinnick-House, the antient seat of the Killegrew family

(Borlase's *Antiquities of Cornwall*; Carew's *Survey of Cornwall*; M'Culloch's *Commercial Dict.*; *Boundary Reports*; *Municipal Corporation Reports*; *Population Returns*; *Ecclesiastical Revenue Reports*.)

FALSE POSITION, a rule of arithmetic, which, though originally applied to such questions as are soluble by equations of the first degree, has been in modern writings, and upon principles explained in APPROXIMATION and INTERPOLATION applied to equations of all degrees. It is however of very little use, though of some notoriety, and a general explanation will be sufficient.

Let there be a function of x, ϕx, which it is desired to make equal to a, and firstly, let this function be such that successive *equal* increments added to the value of x produce successive *equal* increments (or decrements) in the value of ϕx (which is, in fact, supposing that ϕx is of the form $mx + n$): assume two values for x, p, and q, and let the corresponding values of ϕx be P and Q. If then (to use the easiest form of speech) a uniform increase of x is accompanied by a uniform increase of ϕx, and if x represent the value which makes ϕx equal to a, it follows that the interval between P and Q bears to that between p and q the same proportion as the interval between P and a bears to that between p and x. Or x can be obtained from the proportion

$$\mathrm{P}-\mathrm{Q} : p-q :: \mathrm{P}-a : p-x$$

If the preceding be not easily understood, the same proportion may be immediately deduced from

$$mp + n = \mathrm{P},\ mq + n = \mathrm{Q},\ mx + n = a$$

which follow from the several hypotheses made.

When ϕx and x do not increase uniformly together, it is nevertheless true that they do so *nearly* when the successive increments added to x are very small. If then p and q can be found so that P and Q are near to a, the use of the preceding proportion will produce a value of x which is nearer the truth than either p or q, and may be substituted for either in a repetition of the process, which will then produce a still nearer value.

The rule of False Position, as thus extended, is simply Newton's well-known method of approximating to the roots of equations, with this difference, that instead of the differential co-efficient of ϕx, the approximation $(\mathrm{P}-\mathrm{Q}) \div (p-q)$ is used. The equation of the first degree is one in which either method will bring an accurate result in one process; but the notoriety of the rule of False Position arose out of its appearing that a couple of errors, or wrong solutions, were made infallibly to give the right result: and thus it is that Recorde says he can solve mathematical questions by taking the answers of any children or idiots who may be in the room. To persons ignorant of algebra there seems to be a mystery in the being able to make any two guesses, however remote, to discover the truth. Thus, what is that number whose half, third, and fourth, together with 10, make 62? Make any guess, say 12: the half, third, and fourth of 12, together with 10, make 23, which is wrong. Make another guess, say 60, which produces 75, also wrong. The difference of the wrong results, 75—23 or 52, bears to the difference of the wrong assumptions, 60—12, or 48, the same proportion as the excess of the result 75 over 62 (the required result) bears to the excess of 60 over the truth. But 52 : : 48 13 : 12, or 12 is the excess of 60 over the truth, that is, the true answer is 48, as may easily be verified.

Where the equation is of the form $mx = a$, one guess only will suffice. If the assumption of p give P, or if $mp = \mathrm{P}$, then $\mathrm{P} : p :: a : x$

FALSETTO, in Music, an Italian term, signifying a false or artificial voice, produced by tightening the ligaments of the glottis, and thus the vocal compass is extended about an octave higher. The Italians call the falsetto *voce di testa*, or voice from the head; the natural voice *voce di petto*, or voice from the chest.

FALSTER, a Danish island in the Baltic, due south of Seeland, and east of Laaland or Lolland; between 54° 30′ and 54° 58′ N. lat., and 11° 45′ and 12° 11′ E. long. The strait called the Gaabensesund separates it from Seeland, and the Goldburgsund from Laaland; on the north-east, the Groensund divides it from the island of Moen. Its greatest length from north to south is about 25 miles, and its greatest breadth from east to west is about 16 miles. The area is about 177 square miles, and the population about 17,500; in 1801 it was 15,548. It forms the eastern part of the circle or 'stift' of Laaland or Falster. It lies higher than Laaland, has better water, and a healthier at-

mosphere, and is accounted one of the best cultivated and most productive parts of the Danish dominions. The surface is level, and in the south the island terminates in two long tongues of land, formed by an arm of the sea called the Noret. The western tongue of land has a lighthouse upon it, beyond which a reef of rocks extends far into the sea. The soil is equally fertile with but less swampy than that of the other Danish islands near it: the produce of grain is more than adequate to the consumption, so that between 30,000 to 35,000 quarters are annually exported. Flax and hemp, hops, potatoes, and other vegetables, are grown. Large quantities of fruit are raised, and apples in particular are a considerable article of exportation. The woodlands occupy about one-sixth of the whole surface. Horned cattle and a native race of sheep are bred, and the forests afford food for a great number of swine. Much wax and honey are obtained; and poultry, geese especially, are abundant. There are no rivers but the Aar, an inconsiderable stream, and the short river through which the Mariboersee, a large lake, has an outlet into the sea. There are no manufactories in the island; and the people make their own clothing, stockings, and brandy. The principal imports are colonial produce, salt, and tobacco; and the exports are grain, salt meat, butter, fruit, live cattle, potatoes, &c. There is some ship-building.

Falster is divided into two districts, the North and South Hardes, and contains 28 parishes, 2 towns, and 107 villages and hamlets. Nykioebing, the chief town, is situated on the western side of the island upon the Goldborgsund; it is a pleasant well-built place, has some traces of its former fortifications, contains a cathedral and church, several schools, a town-hall, a hospital, about 250 houses, and a population of about 1600. There is an antient castle, in which several dowager queens of Denmark have resided, called Norre Ladegaard. The situation of this town is so picturesque, that it has been termed the northern Naples. It has a good corn trade. Stubbekiobing, the other town, is an inconsiderable place on the Groensund in the north-east, opposite the island of Baagoe; it is surrounded by walls, and has eight streets, a church, a school, and poor-house, about 130 houses, and about 700 inhabitants.

FALUN, a town in Sweden, the capital of the province of Dalecarlia, and of the Län of Kopparbergs, lies in 60° 35′ N. lat. and 15° 35′ E. long. The population is about 4000 or 4500. The town is built in a wide valley between two lakes, which are not far from it. It is celebrated for the great mine of copper which is in the middle of the town. Unlike all other mines, this is an immense abyss, about 1200 feet long and as many wide, into which people descend by a staircase to a depth of 1200 feet; the ore is detached by the miners from the bottom of this hole, so that they are not obliged to use candle-light. The vapours which continually rise from the mine have destroyed every trace of vegetation in the neighbourhood, and even wild animals and birds are rarely seen. The annual produce of this mine is from 4000 to 4500 skippounds of copper. It also produces gold to the annual value of from 200 to 300 ducats, silver from 400 to 500 marks, lead from 100 to 150 skippounds, vitriol from 600 to 800 tons, ochre about 1000 tons, and brimstone from 20 to 30 skippounds. The copper is sent to Avestad to be refined and worked up. There are a few manufactures of linen, cotton and wool, but all on a small scale.

FAMAGOSTA. [Cyprus.]

FAN PALM. [Chamærops.]

FANARIOTES, a name applied to the inhabitants of the Fanar, or Greek quarter of Constantinople. After the capture of Constantinople by the Turks, the Greeks of the Fanar, taking advantage of the ignorance of the Turks, succeeded in rendering themselves necessary to the ministers of the Porte as translators, and to other Turkish grandees as secretaries, agents, and men of business in general. They were all comprised under the general denomination of Grammatikoi, clerks or scribes. At first they were not distinguished from common servants; and the office of the translator to the Sublime Porte conferred no consideration on the individual who held it. The Greek translator explained to the Turkish ministers the contents of a foreign dispatch, after which he retired into the great hall of the palace, where he waited with other menials till his masters might want him.

In the year 1669, under the reign of Mahomet the Fourth, a Greek called Panayotaki persuaded the Turkish divan that the interests of the Sublime Porte would be much better served by an official interpreter, honoured with the full confidence of the government, than by the ordinary translators who had hitherto been employed. The government acted on this suggestion, and Panayotaki was nominated dragoman of the divan, or translator to the council of the state. The successors of Panayotaki continued to enjoy the advantages conferred on their predecessor, which were gradually enlarged. From that time the ambition of the Fanariote families became entirely turned in that direction, and they instructed their children in the Turkish, the Italian, and French languages, in order to enable them to discharge the duties attached to the office of the dragoman.

In the progress of time the divan created another dragoman, who was called the dragoman of the fleet, whose duty was to accompany the capitan pasha, or grand admiral, on his annual tours in the Archipelago for the collection of taxes. Although the office of the dragoman of the fleet was much less important than that of the dragoman of the divan, it was more lucrative, being estimated at about 300 purses, while the fixed salary of the dragoman of the Porte did not exceed 94 purses. The dragoman of the fleet exercised an almost unlimited power over the islands of the Archipelago, which, with the exception of Cyprus and Candia, were governed by officers called mooselims, chosen by the capitan pasha, and renewed every year. The dragoman of the fleet always purchased the appointments to those offices, which he resold with considerable profit. The capitan pasha never acted without the advice of the dragoman, who even frequently acted as his master's deputy in the collection of taxes from the above-mentioned islands. The Fanariotes, thus invested with the office of dragoman of the divan, being the only agents of communication betwixt the Porte and the European governments, necessarily acquired a great influence over the Turkish government, and they took good care to turn it to their own advantage. In the beginning of the eighteenth century the Fanariotes succeeded by their intrigues in prevailing on the Turkish government to choose from among them the Hospodars or princes of Moldavia and Wallachia, which dignities had been hitherto bestowed on natives of the above-mentioned provinces.

Maurocordato was the first Greek who was nominated Hospodar of Wallachia in 1711. A crowd of Fanariotes always followed the new Hospodars, who employed them in different offices in their respective provinces, where they became notorious for their unprincipled exactions, employing every means, however odious, to acquire as much wealth as possible during their short and precarious tenure of office. The Hospodars, who partook of this ill-gotten wealth, countenanced and protected them in all their proceedings. The mode of government has been since changed in the above-mentioned provinces of Moldavia and Wallachia.

The offices of the dragomans and the principalities of Moldavia and Wallachia were not the only sources of wealth to the Fanariote families: the bankers of the Fanar disposed of the greater part of the military and civil appointments in the Ottoman empire. Although precluded by their religion from holding any of those offices, they purchased the appointments to them from the grand vizier at a high price; and the Turks who wished to be invested with the command of a fortress, the government of a province, on any other similar charge, could find at the confidential banker of the vizier the firmans or nominations for the desired places, with the name left in blank. The purchaser entered into an arrangement with the banker, who filled up the blank with his name, and commissioned one of his Greek agents to accompany the new governor to his province, which he administered in his name, and collected from the revenue the sums advanced by the banker to the grand vizier with the most usurious interest. Many judicial appointments of the Turkish empire were also purchased by the bankers of the Fanar, and resold at a considerable profit. It is superfluous to add, that this system led to general oppression, and the most venal administration of justice. Besides this infamous traffic in public offices, the Fanariotes conducted almost all the private affairs of the Turkish grandees. They purchased, sold, and managed their estates, which the supineness and ignorance of the proprietors entirely abandoned to their care. The profits which they realized from such transactions generally amounted to from forty to fifty per

cent. An interesting picture of the Fanariotes is given in Mr. Hope's celebrated novel 'Anastasius; or, the Memoirs of a Greek;' as well as in the 'Essai sur les Fanariotes,' by Marco Zallony; and in a work published by Von Hammer, called 'Constantinople and the Bosporus.'

The events which have followed the last Greek revolution have considerably diminished the importance and altered the position of the Fanariotes.

FANCY, a corruption of phantasy (φαντασία), which term in antient philosophy indicated the sensuous appearance of an object, and in a general sense was used as co-extensive with conception, or the faculty by which man reproduces images of objects either absent or present, without an immediate impression on the organs of sensation. In later times its signification has been greatly narrowed, and it is now limited to a particular province of the imagination, with which, however, it is often frequently confounded in loose and inaccurate language, and to which it is employed as equivalent. Imagination differs from conception either by the greater distinctness and vividness of its images, or else by combining the manifold materials of experience into a new and true unity. In the former case it is merely reproductive; in the latter creative, and becomes fancy:—

> 'Of all external things
> Which the five watchful senses represent
> She forms imaginations, aerie shapes.
> MILTON, Par. Lost, v.

Fancy is a higher energy of the mental activity than imagination simply, but is nevertheless dependent upon it, since it is the latter that furnishes the materials out of which it creates its phantasies either by modifying or exaggerating them, or by forming new combinations, and by a prosopopœia investing its personification with the properties of real beings. Imagination is necessary to authors generally, but both imagination and fancy to the poet; the latter presenting him with those lofty speculations which comprise what has been termed the ideal of art, and furnishing the link for that enchainment of his ideas which, rejecting the restraint of all general laws, is wholly dependent upon the peculiarities of the poet's mental temperament.

FANDANGO, a quick dance in 3/8 or 6/8 time, universally admired and practised in Spain, and supposed to be of Moorish origin; though Volney ascribes much higher antiquity to it, believing it to have come originally from Carthage, thence to Rome, and so into Spain. The probability however is that it was brought into Europe by the Arabians, to whom certainly it may have been transmitted from very remote ages. Like many other dances, this is performed with more or less propriety according to the degree of delicacy possessed by those who practise it.

FANO. [URBINO E PESARO.]

FANOE. [DENMARK, vol. viii., p. 398.]

FANSHAWE, The Right Honourable Sir RICHARD, was the youngest son of Sir H. Fanshawe, and was born in 1608, at Ware Park, in the county of Hertford. He became a fellow-commoner of Jesus College, Cambridge, in 1623, and removed to the Inner Temple in 1626. On the death of his mother, who had long survived his father, he betook himself to travel, and visited France and Spain. He was subsequently appointed secretary to the embassy at Madrid, and was left resident there till 1638. After his return, and on the breaking out of the civil war, he declared himself a royalist, and attended the court at Oxford, where he received the degree of Doctor of Civil Law. He followed the prince of Wales to the islands of Scilly and Jersey in the capacity of secretary, and in 1648 became treasurer to the navy under Prince Rupert. At the battle of Worcester he was taken prisoner, but contrived to be released, and repaired to Charles II. at Breda, who appointed him master of requests and his Latin secretary. He returned to England with Charles, represented Cambridge in 1661, and was employed in negotiating Charles's marriage with Catherine. He was sent as ambassador to Philip IV. of Spain in 1664, and died at Madrid in 1666, leaving a widow and five children. His body was sent home embalmed.

Notwithstanding the active life of Fanshawe, he found leisure to attend to literature, and produced several works, the most celebrated of which is a translation of Guarini's 'Pastor Fido.' The parts of this work written in heroic measure are harsh and ill-managed, but the lighter lyric passages are playful and often melodious, and some of the more sublime choruses are sonorous and majestic. This book is not very easily procured. It was published in 1664, and is adorned with a curious portrait of Guarini.

FANTEES, or FANTINS, a nation inhabiting a part of the Gold Coast in Western Africa. The country of the Fantees is bounded by Acron on the east, and by Sabo, from which it is divided by the Iron Mountain, about three miles east from Cape Coast Castle, on the west. Its entire length, according to Bosman, is nine or ten miles. The capital, called Fantin, is placed about fifteen miles inland, but all the other towns of note lie along the sea-coast. Taking them in their order from east to west, the principal are:—Manfro, Laguyo, Aqua, Cormantin, Ameisa, the Lesser Cormantin, Aga or Adja, Annamaboe or Jamissia, and Anikan or Ingenisian. At many of these places the Dutch, Danes, Portuguese, and English, used to have forts or factories. The natives are described as principally employed in fishing. The government antiently seems to have been less of a despotism than that of most of the surrounding nations. 'Here,' says Bosman, 'is no king, the government being in the hands of a chief commander, whom they call their Braffo, a word importing leader. He is a sort of chief governor, and has the greatest power of any in the whole land, but is somewhat closely restrained by the old men, who are a sort of national counsellors, not unlike some European parliament, acting perfectly according to their inclinations, without consulting the Braffo. Besides these, every part of Fantyn hath also its particular chief, who will sometimes scarce own himself subject to the Braffo, who hath the ineffectual name only of supreme power.' Since the commencement of the present century the country of the Fantees has been overrun by the Ashantees, and its recent history will be found in the article on that people. [ASHANTEE.]

FARCE. [ENGLISH DRAMA, vol. ix., p. 417.]

FARIA E SOUSA, a Portuguese escudero, and a writer on various subjects, chiefly in the Spanish language, was born in 1590, in a country residence called Caravella, in the province of Entre Minho e Douro. His talents were so precocious, that in 1600 he attended the lectures of his father and others at the university of Braga, and soon after, being desirous to become familiar with the Greek and Roman classics, he repaired, in 1604, to the learned Gonçalo de Moraes, bishop of Oporto. This new tutor soon appointed him his secretary, notwithstanding Faria's constant rejection of all offers of preferment on condition of entering the church, and notwithstanding his consecrating the first essays of his muse to his mistress Amelia. This lady was probably the same Donna Catalina Machado whom Faria married in 1614, whose stoical calmness in a tremendous storm at sea he celebrated in his 'Fuente de Aganippe' (Od. ii. part 3). In 1619 Faria quitted Portugal to try his fortune at the Spanish court; but his independent character prevented his success, and he returned to Portugal. Being unable to improve his prospects in Portugal, he once more resorted to Madrid, and at last in 1631 obtained the secretaryship to the Spanish embassy at Rome under the marquis of Castel Rodrigo. Although he attracted the notice of the Italian literati, and even numbered Pope Urban VIII. among his patrons, Faria could not agree with the marquis, and returned to Spain in 1634. After many sufferings, proceeding from the resentment of this personage, he was allowed at last to settle as a prisoner at Madrid, where, abandoning all thoughts of advancement, he devoted the remainder of his life solely to letters with such ardour as to hasten his death, which took place on the 3rd of June, 1649.

Faria adhered closely to that extravagant school which in Spain was fostered so much by that of the Martinists in Italy. He revelled in bold flights of fancy, but all his beauties are like flowers buried in parasitical weeds. He wrote daily, as he says himself, twelve sheets; and moreover had such facility in rhetorical turns and flourishes, that in a single day he could compose a hundred different addresses of congratulation and condolence. On the other hand, his historical works, which are written in Spanish, are still valuable for their subject-matter. The rest of his works are not all in that language, as we find it stated in the 'Biographie Universelle.' Out of his select 600, or, as he terms them, 'six centuries,' of sonnets, exactly 200 are in Portuguese, and twelve of his eclogues are also in that language.

His works are:—1st. Noches claras, o Discursos morales y politicos. 2nd. Comentarios sobre la Lusiada, on

which he laboured twenty-five years, and yet the commentary, except on historical points, rather obscures than illustrates the original. It was prohibited first by the Inquisition of Spain and more strictly afterwards by that of Portugal. This occasioned the following work:—3rd. Defensa por los Comentarios sobre la Lusiada. 4th. Epitome de las Historias Portuguesas, or a History of Portugal. 5th. Imperio de la China, y Cultura Evangélica por los Religiosos de la Compania de Jesus, written by Samedo, but published by Faria. The following are his posthumous works:—El Asia Portuguesa desde 1497 hasta 1640; La Europa Portuguesa hasta 1557; El Africa Portuguesa, translated by John Stevens, 3 vols. 8vo., London, 1796; El America Portuguesa, inedited; Fuente de Aganippe, o Rimas varias; Divinas y humanas Flores; Gran Justicia de Aragon; at the end of which is the 'Retrato de Manuel Faria,' that is to say, his Life, by his friend Porcel. Besides this work the reader may consult Bouterweck, *Spanish and Portuguese Literature;* Nicholas Antonius, *Biblio. Hisp.;* Niceron, *Mémoires*, &c., vol. xxxvi.

FARI'NA. [STARCH.]

FARM. A farm is a portion of land which is set apart for cultivation either by the proprietor or by a tenant who pays a certain stipulated rent for it. We shall consider it in this latter sense; and, without entering into the mode of cultivation, we shall notice the circumstances which determine the profit that a tenant may reasonably expect to make in return for his trouble and outlay.

The first thing to be considered in taking a farm is the capital which the tenant is possessed of, or of which he can procure the use at a reasonable rate. If a man takes a farm without the means of stocking it properly, and is restrained in his first outlay, he will never be able to cultivate it with benefit to himself or to his landlord: he will be obliged to sell his produce at a loss, to over-work his cattle, and to keep a smaller quantity of stock, and consequently make less manure than is required to keep the farm in a productive state. It is not sufficient that he has the means of stocking the farm; he must have wherewith to pay the greater part of the whole expenses and the rent for the first year. In the present state of agriculture, a man who takes a farm of 200 acres of arable land, or land partly arable and partly good pasture, will require from 1600*l.* to 2000*l.*; and it is not the interest, either of the landlord or the tenant, that he should take the farm unless he can command that sum. The amount of capital required depends in a great degree also on the quality of the land; very rich land requires less capital in proportion to the rent than poor land, especially if the poor land requires draining, chalking, or marling, before it will produce any tolerable crops. All these circumstances must be taken into consideration before a farm is hired.

When it is ascertained what extent of farm may be safely undertaken with a given capital, the most important object to be attended to is the condition and fertility of the soil, not only with respect to the natural quality of the land, but the actual state it is left in by the preceding system of cultivation. A moderately fertile soil, in good condition, will give a greater profit for several years than a better soil which is partially exhausted and rendered foul by injudicious management and over-cropping. For this purpose it is necessary to ascertain what has been the state of the crops for several years before, how the land has been ploughed, and whether the crops have been heavy with or without manure. There is no method yet found out of ascertaining the comparative state of land which has been exhausted. It would be a discovery well worth the attention of modern chemists, who have made such progress lately in the analysis of vegetable substances, and would be invaluable to farmers and proprietors of land. In the mean time the nature of the weeds which abound on the land will give some clue to its state; and an experienced person will collect from various minute appearances in the soil whether it has been fairly managed or exhausted. It is in general more advantageous to take a farm in a district with which you are well acquainted. It will be a great advantage if you have had an opportunity of seeing the land at all times, observing it in different seasons and states of the weather, and especially of seeing the crops threshed out, and ascertaining the quantity of corn which is usually yielded from a certain quantity of straw, for lands very similar in outward appearance will produce a very different return when the crops are threshed out. A want of attention to these circumstances is the cause that a man who comes from a distant part of the country and hires a farm on his own judgment seldom succeeds so well as might be expected, even with a superior knowledge of agriculture. He naturally compares the soil with some similar soil which he has been acquainted with. If he comes from a district where the soil is sandy, and where clay is in request, he will give the preference to very stiff loams; if he comes from a cold wet clay, he will prefer the sandy; and the chances are, that he is mistaken in his judgment, and finds it out when he has already embarked his capital in a losing concern. Next to the nature of the soil is to be considered the convenient situation of the farm, the disposition of the fields, and the adaptation of the farm buildings to the most profitable occupation of the land. The roads, especially those which lead to neighbouring towns, whence manure may be obtained, are a most important object; and if there is water carriage, it greatly enhances the value of the farm. The roads to the fields, and the distance of these from the farm-yard; the convenience of having good pasture, or land easily laid down to grass, near the homestead, and especially the situation of the farm-buildings with respect to the land, and the abundance of good water, are all circumstances which must be well considered, and which will greatly influence the probable profits, and consequently the rent which may be fairly offered. A central situation is no doubt the most advantageous for the farm-buildings, as greatly diminishing the labour in harvest and in carrying out manure. But there may be circumstances which render some spot nearer the extremity of the land more eligible, and it is only when entirely new buildings are to be erected that there is a choice. The old farm-buildings are generally in low and sheltered situations, but it is a great inconvenience to have to carry the manure, which is the heaviest thing carted on a farm, up a steep hill. The best situation is on a moderate slope, neither in the lowest nor highest ground.

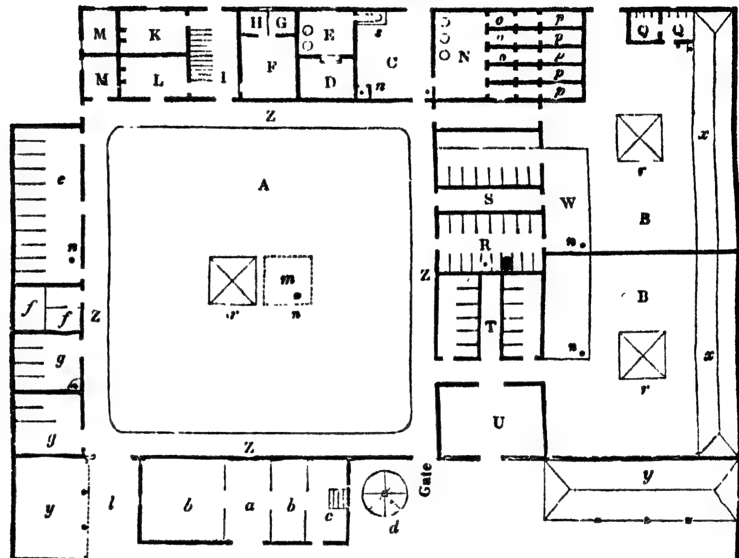
The disposition of the buildings is of great importance both to the landlord and tenant. Large straggling buildings are inconvenient, and cost much in repairs. The house should be neat and comfortable, fit for the residence of a farmer who has a capital such as the farm requires. The rooms should be airy and healthy, facing the south, with a neat garden in front of the house. The farm-yard should be to the north, behind it. Near the house and the farm-yard there should be a small paved court separated from the yard by a low wall. In this court, which should communicate with the dairy, the utensils may be placed on proper benches to air and dry in the sun. The architecture of the buildings may be left to the taste of the proprietor or his architect. The simpler it is, the more appropriate. The yard or yards in a large farm should be sheltered on the north side by the barns, which need not be so extensive as used formerly to be thought necessary. If there is a threshing machine, a single floor to thresh the seeds upon, and to employ the men occasionally in winter, is quite sufficient. Every farm which is so extensive as to require more than one floor to thresh the corn on ought always to have a threshing-mill attached to it. [BARN.]

A small yard, distinct from the other, with sheds for the cattle to shelter themselves under in wet and stormy weather, is a great advantage, and may be added at a trifling expense to any set of farm-buildings. The cart-sheds should be in the stack-yard, which properly occupies a space north of the barn. There should be a sufficient number of stands with proper pillars and frames to build stacks on. Each stack should be of such a size as to be conveniently taken into the barn to be threshed out. The round form, and the square which becomes nearly round when built up, are the most convenient. Nine stone or cast-iron pillars with caps over them are placed on brick foundations, and support a strong frame on which the stack is built. In the centre of the stack there is usually a pyramidical open frame, to allow the air to circulate through the stack, and prevent the heating of the grain. On each side of the yard should be placed the stables, cow-houses, and feeding-stalls, with a pump of good water near the last, and convenient places to put hay, straw, and turnips in, with a machine to cut them. A great deal of time and labour is saved by a proper arrangement of the different parts of the farm-buildings. An underground cistern near the cow-house and stables, into which the urine and washings of the cow-house may run by means of a sink or drain, is a most useful appendage, which is too little thought of in England, whereas it is one of the most indis-

pensable parts of a Flemish farm. It supplies a kind of manure, which can be applied to the land at all times, which invigorates sickly crops, and may often produce an abundant return, where otherwise there would be a complete failure. There are many plans of farm-buildings given in works on agriculture, which combine all that is useful on a large scale. Most of these plans have been executed at a great expense for the farming establishments of noblemen and men of large fortunes. They may be considered as the palaces of husbandry, where much is expended for the sake of grandeur. But the proprietor who desires to erect buildings most proper for the occupation of his land must study economy, and lay out no more in buildings than is necessary. They should be so substantial as not to require frequent repairs; without unnecessarily increasing the original expense of materials and labour. Light thatched roofs are sufficient for the sheds and smaller buildings, and even for the cow-houses and stables; but the waste of straw and the danger from fire should be set against the cost of tiles or slate as a covering. The barn should not be thatched, unless it can be done with reeds, which form a durable and impervious covering, not subject to be infested with rats. The house should always be detached from the farm-buildings, and should have a tiled or slated roof.

We here give a plan of plain farm-buildings for the occupation of 200 or 300 acres of land, of which two-thirds are arable, fit for turnips, barley, clover, and wheat. The farm house should have a large kitchen, two good parlours, and five or six bed-rooms; a wash-house, with coppers to brew; a scullery, and larder. The dairy should communicate with the house, and with a small paved court, near which are the pig-sties and the cow-house. There should be two distinct farm-yards with proper sheds, and in each there should be a cistern for the urine from the stables and the drainings from the dung.

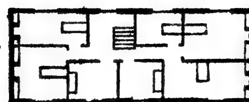
Buildings for a Farm of 300 acres



A, principal yard.
B, second feeding yard, divided.
C, small paved yard adjoining the dairy and piggery.
D, dairy two feet under the level of the yard.
E, wash-house and brew-house.
F, kitchen.
G, skullery.
H, larder.
I, entrance and stairs.
K, best parlour.
L, second ditto; cellars under them.
M M, coal and wood-house.
N, steaming-house for pigs.
Q Q, Hen-houses.
R, calf pens.
S, cow house for sixteen cows, with a passage through it.
T, bullock-house.
U, root and straw-house to cut turnips, chaff, &c.
W, cistern divided into two by a partition, sunk seven feet and vaulted over.
Z, paved road round the yard.
a, barn floor.
b b, bays.
c, raised floor and thrashing-mill.
d, horse race.
e, horse stable.
f f, loose boxes.
g g, spare stables and chaise-house.
h, granary on stone piles.
i i i i, corn-stacks.
l, entrance to the yard
m, tank covered over
n n n, pumps.
o o o, pig-styes.
p p p, small open court to each stye.
r r, feeding cribs.
s, oven.
x x, open sheds for cattle.
y, cart-sheds.



Elevation towards the Garden.



Upper floor.

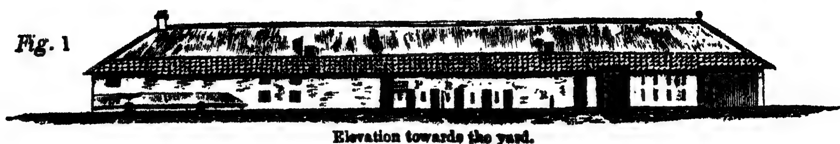


For a small occupation, where the tenant is but a little above the rank of a day labourer, a set of buildings all under one roof, and forming the longer side of the yard, which may have open sheds round it, such as is represented in the annexed figure and plan, is at once convenient and economical. If this building is thought too long, it can very easily be divided into two, which may be placed at right angles to each other and form two sides of a square. The farm-house and cow-house might form one side, and the stables and barns the other. This is the more common distribution in Flanders.

Flemish Farm Buildings.

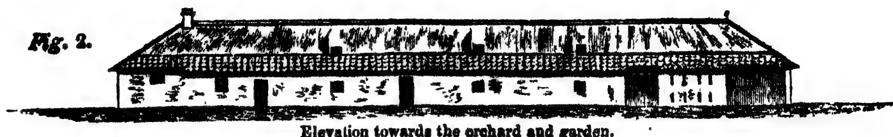
Fig. 1

Fig. 1.
P, privy.
R R, pumps for urine



Elevation towards the yard.

Fig. 2.



Elevation towards the orchard and garden.

Fig. 3.
B, kitchen.
D and E are sleeping rooms raised a few feet above the kitchen and over the dairy and cellar.
F, a work-shop for weaving and other work.
G, passage to feed the cattle.
I I, cow-house.
L L, pig-styes.
M, stable.
N, barn-floor.
O O, bays.
P, cart shed.
Q, privy.
R R, pumps for urine.

Fig. 3.

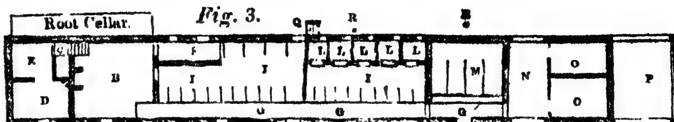
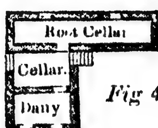
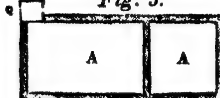


Fig. 4.



Sunk floor arched over.

Fig. 5.



A A, Urine tank, under the stable and cow-house, 51 feet by 20, and 6 deep, with a partition in it.
Q, privy.

5 10 20 30 40 50 60
SCALE OF FEET.

These two examples of farm-buildings will be sufficient to give some idea of what may be proper for farms of an intermediate size. A principal thing to be attended to is to have plenty of room for cattle: and where old barns remain much larger than is required according to the present mode of stacking corn in the yard, they can be very advantageously converted into cow-stalls or ox-stables. Where many sheep are kept, it is of great advantage to have a sheep-yard, with low sheds all round, at the time when the ewes lamb, especially when the season is wet and chilly, which hurts them more than a dry frost. The second yard B (see plan, p. 197) is well adapted for that purpose; and an additional temporary shed against the partition which divides it in two will convert either division into an excellent sheep-yard.

In valuing the rent of a farm the habitation of the farmer is seldom taken into the account, and it ought not to be above the station of the tenant; but the buildings immediately connected with the cultivation necessarily add to the rent or diminish it, as they add to or diminish the profit.

The next important question is what may be a fair rent both to the landlord and the tenant. This depends as much on the mode of cultivation adopted as on the fertility of the soil. The tenant must have a fair interest for his capital, and a fair remuneration for his trouble. In the old system a third of the gross average produce was considered as a fair rent, including all the direct payments for the occupation of the land, such as tithes, rates, and taxes; another third was supposed to cover the labour and expenses of the farm and interest of capital; and the remaining third was appropriated to the maintenance of the farmer and his family, out of which he had to save whatever he laid by as a clear profit. But this calculation is no longer applicable to the present state of agriculture. The expenses are greatly increased, and the produce is also greater. It requires a greater capital, and more skill to manage a large farm. The tenant is a man of a more liberal education, and his habits are more expensive. The occupier of 500 acres of land in England expects to live as well as a land-owner of 500*l.* a year income. He cultivates better by applying more labour, and much of the produce is owing to his skill and his capital. He therefore expects a greater share of the produce than the landlord, not only to repay his outlay, which is greater, but to live upon. Supposing the tenant to have a capital employed equal to ten times the rent, which is often the case, the gross annual produce ought to be equal to five times the rent. This we shall distribute as follows: two-fifths for expenses, including rates, tithes, labour, and interest of capital at 5 per cent.; one-fifth for rent; one-tenth for improvements and purchased manure; and three-tenths for the net profit of the farmer, out of which he is to live. This appears a less proportion than the old third; but it must be remembered that the produce is greatly increased. It will be found, wherever accurate accounts are kept and a farm is skilfully managed, that the proportions above stated are not far from the truth. It requires much judgment and experience to calculate what average crops may be expected by an improved mode of cultivation, and especially by increasing the number of cattle and sheep maintained on the farm.

In Scotland it is notorious that rents are much higher than in England, not only for small occupations, but for extensive farms; and that the tenants have complained less of the times than their neighbours in the south. It may be worth while to inquire into the cause of this, for the low price of corn must affect the Scotch farmer equally with the English. One great difference between the Scotch and the English farmer is, that the former gets work done at a cheaper rate than the latter. The Scotch labourer is fully as well fed, and clothed, and lodged, as the English; but he has less money to spend at the alehouse. He is paid, not in a certain sum every Saturday, but in comforts, in the keep of a cow, in a certain number of rows of potatoes, a certain quantity of malt to make his beer, a cottage to live in, and a meal to feed his family. His immediate wants are supplied, and he is comfortable; the consequence is, that he works willingly. He has no remnant of the last night's debauch at the beer-shop. He is early at work, and he does his work cheerfully. The horses of a Scotch farmer are well fed; they are always in good condition. They work ten and even twelve hours in a day at two yokings. The ploughman only thinks how he shall finish his work in proper time, and unless he makes the horses work as much as they can without distressing them, he knows he shall not get through his work. All this is worth 25 per cent. on the whole labour of the farm, as Arthur Young has very judiciously calculated, when he gives the expense of labour on the farm of a gentleman, compared with that on the land of a farmer who works with his men. (See *Farmer's Guide.*) The moral effect of an interest in the work to be done, when opposed to that of a perfectly distinct and often hostile interest, will readily account for so great a difference.

But besides this the Scotch farmer has generally the advantage of a scientific education, and of a thorough knowledge of the principles of his profession; and with the shrewdness peculiar to his country, he knows how to take advantage of every favourable circumstance. He has also been taught to calculate, and will soon discover where there is a profit or a loss. This has made him turn his attention to cattle and sheep of late years, more than to the production of corn; and the Scotch have found, that while a very

decent profit was made on the cattle, their land produced more corn, although it sold at a lower price; for the green crops raised for the cattle, and the manure made by them, enriched the land so much, that the average produce on some light lands was nearly doubled. All this kept up rents to a much higher level than in England, where prices were low, and there were no means of diminishing expenses or increasing produce. Hence rents in Scotland have kept up wonderfully, when we consider the great fall of rents in England since the peace.

The price of agricultural produce throughout Great Britain and even Ireland is brought very nearly to an equality, the only difference being occasioned by the means of transport. But the price of labour still varies much, and this is owing to local circumstances, which it is hoped will gradually cease. While the very unequal distribution of the expense of the maintenance of the poor was not remedied, adjoining parishes might differ in any proportion with respect to the actual price of labour; and before a fair rent could be calculated, it was necessary to consider how much of the value of the labour was paid directly, and how much in the shape of rates. Our northern neighbours were free from this uncertainty.

Farm Accounts.—In proportion as the management of a farm requires more skill, and the various operations become more complicated, so the necessity of great accuracy in the accounts becomes more evident. The manner in which farm accounts should be kept deserves therefore particular attention.

Many farmers, who are not devoid of intelligence, and who are anxious to ascertain their gain or their loss in cultivating the land which they have hired, have no other means of ascertaining this than the balance of their account of receipts and expenditure. If they have separated the accounts of their private establishment from that of their farm, they think that they have done all that is required, and at the end of the year they can tell accurately how much they have gained or lost by their farm. But ask them to account for this gain or loss, and they can give no answer. If a tradesman, who has a capital in business equal to that of a farmer of a considerable number of acres, were to keep accounts in this manner, and become a bankrupt, no one would hesitate in saying that he failed because he kept no regular accounts. He had no greater stake than the farmer, and his transactions were perhaps less varied: if he kept no clerk, he should have attended better to the accounts himself. The same may be said of the farmer; and if a man who has a floating capital of 2000*l.* does not think it worth his while to employ a clerk to keep his accounts, not having time to do so himself, it is no great wonder if he is involved in difficulties. But it may be said that agricultural accounts are very simple, and that any one can keep them. So are merchants' accounts at first sight. Nothing is simpler than to put down what is bought and sold, what is the profit on each transaction, and the sum is the profit on the whole. But merchants know that to keep this very simple account many books, many entries, many checks, and consequently many clerks are required. In a lesser degree this is true in a farm. It is easy to know what is bought and sold; what is expended or produced; but it requires very minute accounts to ascertain what part of the farm gives a profitable return, and what is the cause of loss. There may be a profit on the crops and a loss on the stock, or *vice versâ.* The money expended on improvements or adventitious manure may have produced an increase which is proportionate to the outlay, and which affords a good interest; but it may also be a decided loss. How is this to be ascertained, except it be by accurate accounts? The expense of keeping accounts is much overrated. A clerk who has his board and 30*l.* a year is generally a young man who has some education. He is useful in seeing that the operations ordered by the farmer are duly executed. He is a trusty overseer, and, as he has his accounts in his thoughts, he is most likely to detect the cause of any loss, from a want of attention in subordinate agents;—his salary is therefore well earned, and the farmer will not think it thrown away. In whatever manner the accounts are kept, whether by the farmer himself or by a clerk, method is of great importance: and whatever may be said against it by those who do not know its value, there is no system of accounts which can be compared with the well-known method of double entry, as it is called, which is of Italian invention. The principle of this method is so simple, that the slowest arithmetician cannot be confused by it, and it is so perfect that no error can escape its scrutiny. As applied to agricultural accounts, which are simple in their nature, it becomes so clear, that if once adopted, it is impossible that it should ever be abandoned. The satisfaction of a perfect proof of the correctness of the accounts is so great, that no one who has ever experienced it will be satisfied with any other method.

To give a general and comprehensive notion of the system of double entry, to those who are unacquainted with it, would lead us from our present purpose, suffice it to say, that every account is checked by another, in which the same entry is made in a different manner. The sum of all the entries must be equal on each account; and consequently any inequality indicates an error somewhere, which may be detected.

In the accounts of a farm there are many separate items to be taken into consideration. There may be a separate account kept for every field. There should always be one for every crop of which the rotation consists. There is an account of the labour of men and horses; of the produce of the dairy; of the stock purchased to be fatted, or sold again in an improved state. In short the divisions of the general account may be increased without limit. The more subjects there are to furnish items for an account, the more difficult it is to strike a balance, but, with a little attention and perseverance, it may be done; and he who keeps very correct accounts will always be the first to discover any impending evil, and to take measures to provide against it.

The basis of all the accounts is a daily journal of every transaction, which must be collected from all the labourers and agents employed. M. De Dombasle, at his celebrated farm of Roville, in France, has all his principal servants and his apprentices assembled every evening after the day's work is over. Each man gives an account of the work done by him or under his superintendence, which is written down by the clerk. The orders for the next day are then given, and every one returns to his lodging or his home. In the course of the next day the clerk enters all that is in the journal into a book, where every person employed has an account; every field has one; every servant and domestic animal has one; and every item which can be separated from the rest is entered, both as adding to the account or taking from it. For example, the milk of the cows is entered daily. The quantity of butter, butter-milk and skimmed-milk, which it produces is also entered; and these two accounts check one another. Any error is immediately detected, and the knowledge of this prevents mistakes. An entry should be made of every particular operation in each field, that the farmer may know which is his most profitable land. The number of ploughings, the quantity of manure, the state of the weather, and all other circumstances which may influence the return should be carefully noted, in order that it may be clearly seen whether any experiment or deviation from the usual routine is advantageous or otherwise. Thus all real improvements may be encouraged, and uncertain theories detected by the result.

The most important circumstance which influences the profits of a farmer is the cost of his team and the wages of his labourers. These vary in different situations so much, that they greatly influence the rent which he can afford to give for the land. In some parts of the country the horses are pampered and kept so fat that they can scarcely do a day's work as they ought. In others they are over-worked and badly fed. Either extreme must be a loss to the farmer. In the first case, the horses cannot do their work, and they consume an unnecessary quantity of provender; in the other, they are soon worn out, and the loss in horses that become useless or die is greater than the saving in their food, or the extra work done by them. A horse properly fed will work eight or ten hours every day in the week, resting only on Sundays; by a judicious division of the labour of the horses, they are never over-worked, and an average value of a day's work is easily ascertained. This, in a well regulated farm, will be found much less than the common valuations give it. It is here that most of the errors are to be detected in the accounts of the expense of cultivation given in evidence before parliament, without any intention to deceive in those who gave the accounts. There have been printed forms invented in order to render the accounts more simple as well as more comprehensive. Forms may be of use to enter minute details; and each superintendent labourer may have a form of entry for the work which he performs or superintends; but the ledger

should be kept exactly as that of a mercantile man, and be frequently balanced to ensure correctness. This is a thing which cannot be too strongly recommended to young farmers.

When a farm has been agreed for as far as rent is concerned, there are always conditions in a lease, which it is of great importance to the farmer to understand fully. It is necessary that the landlord should have some security against the wilful deterioration of his land by a dishonest tenant, but agents are too apt to cramp the tenants by prescribing the exact mode of cultivation without giving the tenant sufficient scope to try improved methods, which may ultimately be highly beneficial to all parties. If the landlord can ensure that the proper quantity of manure is put on the land every year, and that it shall be well tilled and kept free from weeds, he need not have any other protection, unless it be for the last two or three years of the lease, when the tenant might be induced to over-crop the land, and thus exhaust it.

In entering on a farm there is often a heavy demand on the in-coming tenant for work done by the predecessor, for a supposed remainder of manure, and various other items, which are usually settled by reference to the custom of the country. Some general rule is required to regulate all these demands, which are often exorbitant, and cripple the in-coming tenant in his capital. It is just that an outgoing tenant should be repaid for any permanent improvement which he has made, and of which he has not reaped the whole advantage, and that he should be encouraged to keep up the proper cultivation of the land, so that the incoming tenant may be able to continue the regular course. But this he will not do, unless he expect to be remunerated. On the other hand, it is also just that the in-coming tenant should not pay for work slovenly done or for supposed remnants of manure which do not exist in the land. We have known instances where the valuation of all the items to be paid for by the in-coming tenant greatly diminished his capital and crippled his operations for several years. There should therefore be a separate stipulation on this head before a farm is finally hired.

FARMER, Dr. RICHARD, descended from a respectable family in Leicestershire, was born at Leicester, August 28, 1735. He received the early part of his education in the Free Grammar School of his native town, and in 1753 was entered a pensioner of Emmanuel College, Cambridge. He appears to have been little influenced by the overbearing tendency to mathematical study which existed and still exists in that University, and, after his degree, took no interest in pursuits of that nature, farther than was necessary for the purposes of college tuition. In 1760 he became Classical Tutor of Emmanuel College, which office he held until his election to the mastership in 1775. He served the office of Vice-Chancellor in the same year, and in 1778 was elected Chief Librarian to the University. In 1780 he was collated to a prebendal stall at Lichfield, and some time afterwards became Prebendary of Canterbury, which he resigned (1788) for the office of a Canon Residentiary at St. Paul's. He died after a long and painful illness, at Emmanuel Lodge, Sept. 8, 1797, and was buried in the chapel. An epitaph to his memory was written by Dr. Parr, and is inscribed on the college cloisters. Dr. Farmer collected a valuable library of tracts and early English literature, which was sold after his death and produced, as it is said, a great deal more than it originally cost.

Dr. Farmer's constant residence at Cambridge is said to have been owing to an early disappointment in love; a cause perhaps more productive of resident fellows than any other. His political principles were inclined to toryism, and he appears to have been attached to that party in the church which goes by the name of 'orthodox.' His manners were frank and unreserved, and his habits rather those of a boon companion than of a clergyman. It is reported of him that he declined a bishopric rather than forego his favourite amusement of seeing Shakspeare performed on the stage, a reason which, if founded on truth, had at all events more cogency in the time of Garrick than at present.

Dr. Farmer is celebrated, and justly so, for one single work, his 'Essay on the Learning of Shakspeare,' which, in our opinion, surpasses anything of the kind written in England, and is perhaps the best commentary which we possess. The mixture of gold and rubbish which is generally appended as notes to every edition of Shakspeare contains so little of the former element and so much of the latter, that it is not easy to estimate such commentaries as Dr. Farmer's above their true value; indeed, if we had to choose from all Shakspeare's voluminous annotators what appears to us most deserving of study, we should have no hesitation, as far as English literature goes, in fixing on Coleridge's 'Lectures' and Dr. Farmer's 'Essay,' works which are, and are intended to be, entirely dissimilar, but which, more than any others, come up to our notion of a commentary on Shakspeare.

FARMERS GENERAL, Fermiers Généraux, was the name given in France under the old monarchy to a company which farmed certain branches of the public revenue, that is to say, contracted with the government to pay into the treasury a fixed yearly sum, taking upon itself the collection of certain taxes as an equivalent. The system of farming the taxes was an old custom of the French monarchy. Under Francis I., the revenue arising from the sale of salt was farmed by private individuals in each town. This was and is still in France and other countries of Europe a monopoly of the government. The government has alone the right of providing the people with salt, which it collects in its stores, and sells to the retailers at its own price. This monopoly was first assumed by Philippe de Valois in 1350. Other sources of revenue were likewise farmed by several individuals, most of whom were favourites of the court or of the minister of the day. Sully, the able minister of Henry IV., seeing the dilapidation of the public revenue occasioned by this system, by which, out of 150 millions paid by the people, only 30 millions reached the treasury, opened the contracts for farming the taxes to public auction, giving them to the highest bidder, according to the antient Roman practice. By this means he greatly increased the revenue of the state. But the practice of private contracts through favour or bribing was renewed under the following reigns: Colbert, the minister of Louis XIV., called the farmers of the revenue to a severe account, and by an act of power deprived them of their enormous gains. In 1728, under the regency, the various individual leases were united into a Ferme Générale, which was let to a company, the members of which were henceforth called Fermiers Généraux. In 1759, Silhouette, minister of Louis XV., quashed the contracts of the farmers general, and levied the taxes by his own agents. But the system of contracts revived: for the court, the ministers, and favourites were all well disposed to them, as private bargains were made with the farmers general, by which they paid large sums as douceurs. In the time of Necker, the company consisted of 44 members, who paid a rent of 186 millions of livres, and Necker calculated their profit at about two millions yearly, no very extraordinary sum, if correct. But independent of this profit there were the expenses of collection, and a host of subalterns to support: the company had its officers and accountants, receivers, collectors, &c., who having the public force at their disposal, committed numerous acts of injustice towards the people, especially the poorer class, by distraining their goods, selling their chattels, &c. The 'gabelle' or sale of salt, among others, was a fruitful source of oppression. Not satisfied with obliging the people to pay for the salt at the price fixed upon it in the name of the king, they actually obliged every individual above eight years of age to buy a certain quantity of salt whether wanted or not. But the rule was not alike all over France; in some provinces, which enjoyed certain privileges, salt was nine livres the 100 weight, whilst in others it cost 16, and in some 62 livres. In some provinces the quantity required to be purchased per head was 25 pounds weight; in others it was nine pounds. And yet the provinces, nay the individual families of each province, were prohibited under the severest penalties from accommodating each other's wants, and buying the superfluous salt of their neighbours, but whoever wanted more salt than his obligatory allowance was obliged to resort to the government stores. Besides, every article of provisions that was exported from one province to another was subject to duties called Traites. Every apprentice on being bound to a master was bound to pay to the king a certain sum according to the nature of the trade, and afterwards a much larger sum on his admission to practise his trade as a master. These few instances may serve to convey an idea of the spirit of taxation in France previous to the revolution. A lively but faithful picture of the whole system is given in Breton's *Histoire Financière de la France*, 2 vols. 8vo., Paris, 1829. The farmers general, as the agents of that system, coming into

immediate contact with the people, drew upon themselves a proportionate share of popular hatred. But the revolution swept away the farmers general, and put an end to the system of farming the revenues: it equalized the duties and taxes all over France; but the monopoly of the salt and tobacco has remained, as well as the duties on provisions, cattle, and wine brought into Paris and other large towns, and the right of searching by the octroi officers, if they think fit, all carriages and individuals entering the barriers or gates of the same.

The system of farming the taxes, although generally disapproved of, is still continued in some European states. Not many years ago the custom-house duties at Naples were farmed by private speculators. For the character and effects of the system see Necker, *De l'Administration des Finances*.

FARNABY, or FARNABIE, THOMAS, a learned critic and grammarian, was born in London in 1575. His grandfather was of Truro in Cornwall; but his great-grandfather, an Italian musician, was the first of his family who settled in England. He was admitted of Merton College, Oxford, in 1590, in the station of a servitor; but being of an unsettled disposition, he quitted the university abruptly, changed his religion, passed over to Spain, and was received into one of the colleges of that country belonging to the Jesuits. Growing weary of the discipline of the Jesuits' institution, he did not stop very long with them, but in 1595 joined Sir Francis Drake and Sir John Hawkins in their last expedition. He is reported also to have served subsequently as a soldier in the Low Countries. Gaining no profit in these expeditions, he returned to England, landed in Cornwall, and in the urgency of his necessities descended to the humble employment of teaching children their horn-book. In this situation he assumed the name of Thomas Bainrafe, the anagram of Farnabie. After some time he changed his residence to Martock in Somersetshire, where he established a grammar-school for youth with great success, under his own name. From Martock he removed to London, and opened a school in Goldsmiths' Rents behind Red-cross-street, near Cripplegate, where his reputation became so established, that the number of his scholars, chiefly the sons of noblemen and gentlemen, amounted at one time to more than 300. Antony à Wood says, his school was so frequented that more churchmen and statesmen issued from it than from any school taught by one man in England. Whilst here he was created M.A. in the University of Cambridge, and on the 24th April, 1616, was incorporated in the same degree at Oxford. In 1636 he quitted London to reside at Sevenoaks in Kent, but here he resumed his former occupation, and, with the wealth which he had accumulated, purchased landed property both in Kent and Sussex. In 1641 he became mixed up in the commotions of the times as a favourer of the royal cause, and was fortunate in receiving no other punishment than residences in prison, first in Newgate, and afterwards in Ely House. It was at one time debated in the House of Commons whether he should not be transported to America. Wood insinuates that some of the members of both Houses who had been his scholars were among those who urged his being treated with severity. He died on the 12th of June, 1647, and was interred in the chancel of the church at Sevenoaks.

His own works were—1. 'Index Rhetoricus Scholis accommodatus,' 12mo. Lond. 1625: to which in 1646 were added 'Formulæ Oratoriæ et Index Poeticus:' the fifth edition was printed in 1654. 2. 'Florilegium Epigrammatum Græcorum, eorumque Latino versu à variis redditorum,' 8vo. Lond. 1629, 1650. 3. 'Systema Grammaticum,' 8vo. Lond. 1641. 4. 'Phraseologia Anglo-Latina,' 8vo. Lond. 5. 'Tabulæ Linguæ Græcæ,' 4to. Lond. 6. 'Syntaxis,' 8vo. Lond. His editions of the classics, with annotations, were Juvenal and Persius, 12mo. Lond. 1612; Amst. 1662; Hag. 1663. Seneca, 12mo. Lond. 1613; Amst. 1632, 1634; 8vo. Pat. 1659; 12mo. Amst. 1665. Martial, 12mo. Lond. 1615; Gen. 1623; Lond. 1633. Lucan, 12mo. Lond. 1618; 8vo. Francof. 1624. Virgil, 8vo. Lond. 1634. Ovid, fol. Par. 1637; 12mo. Lond. 1677, &c. His Notes upon Terence were finished only as far as the fourth comedy when he died; but Dr. Meric Casaubon completed the two last comedies, and published the whole at London, 12mo. 1651. Other editions were 8vo. 1669; and Salm, 1671. Dr. Bliss, in his additions to Wood's Athenæ, says, 'Farnaby intended an edition of Petronius Arbiter's Satyricon.' (*Biogr. Brit.* Kippis's edit. vol. v. p. 682; Wood's *Ath. Oxon.* last edit. vol. iii. col. 213-216; *Biogr. Universelle*, tom. xiv. p. 168.)

FARNE'SE, the name of a noble family of modern Rome, who were originally feudatories of the territory of Farnese and Montalto, in the Papal States, south-west of the lake of Bolsena, and near the borders of Tuscany. The splendour of this family was greatly increased by the exaltation of Cardinal Alessandro Farnese to the Papal See after the demise of Clement VII. in October, 1534. [PAUL III.] This pope had a natural son, Pier Luigi Farnese, whom he determined to make a sovereign prince. For this purpose he first of all alienated part of the territory of the church in the neighbourhood of the feudal domain of his family, and formed a duchy called that of Castro, from the name of its chief town, adding to it the towns of Ronciglione and Nepi, with their territories. This district, which comprised nearly one-half of the province called Patrimonio di S. Pietro, he bestowed on Pier Luigi and his descendants, with the title of Duke of Castro, as a great fief of the Holy See. He also obtained for him from Charles V. the investiture of the Marquisate of Novara as an imperial fief, and from the Venetian Senate permission to be inscribed on the golden book of the patricians of Venice, an honour considered as equal, if not superior, to that of a feudal title. The pope also made his son Gonfaloniere, or Captain General, of the Holy See, an office which Pier Luigi dishonoured by the most depraved conduct. Lastly, Paul III. in 1545 gave his son the investiture of Parma and Piacenza, which Pope Julius II. had conquered, with the title of sovereign duke of those states, on condition that the duke and his successors should pay an annual sum of 8,000 ducats to the Roman See. The emperor Charles V., however, who, as Duke of Milan, had claims on Parma and Piacenza, would not bestow the investiture upon Pier Luigi. The new Duke of Parma and Piacenza soon became hateful to his subjects for his vices and oppression, and a conspiracy was formed by Count Anguissola and other noblemen, secretly countenanced by Don Ferrante Gonzaga, imperial governor of Milan, who hated Pier Luigi. On the morning of the 10th September, 1547, Anguissola stabbed the duke while at dinner in the ducal palace of Piacenza, and threw his body out of the window, when it was mutilated and dragged about by the mob. Piacenza was taken possession of by the imperial troops, but Parma remained in possession of Ottavio Farnese, son of the murdered duke. In 1556, Philip II., as sovereign of the Milanese, restored Piacenza to the Duke Ottavio, but the citadel continued to be garrisoned by Spanish soldiers. Ottavio dying in 1587, was succeeded as Duke of Parma and Piacenza by his son Alessandro Farnese, who distinguished himself as general of the Spanish armies in the wars against France. He was made governor of the Spanish Netherlands by Philip II., and carried on the war against the Prince of Orange. He is known in history by the name of the Duke of Parma. Alessandro died in 1592, and was succeeded by Ranuccio Farnese, a suspicious and cruel prince. A conspiracy was hatched against him at Rome, but it being discovered, a number of people were put to death in 1612. His successor, Odoardo Farnese, quarrelled with Pope Urban VIII. about the Duchy of Castro, which that pope wished to take away from him to give it to his own nephews, the Barberini. This gave rise to an absurd and tedious warfare between the papal troops and those of Parma. Ultimately, through the mediation of other princes, the Farnese were left in possession of Castro, but under the following pontificate of Innocent X. they were finally deprived of that territory in 1650, and the pope razed the town of Castro to the ground, under the pretence of its bishop having been murdered by some assassins. This occurred under Ranuccio II., Farnese, Duke of Parma, who had succeeded Odoardo. The Farnese continued to rule over Parma and Piacenza till 1731, when the last duke, Antonio Farnese, having died without issue, the male line of the Farnese became extinct. But Elizabeth Farnese, wife of Philip V. of Spain, claiming the duchy for her children, it was ultimately given, by the peace of Aix la Chapelle, to her younger son Don Filippo. [PARMA.] The other fiefs, however, and the personal property of the Farnese, including the rich museum and the splendid palaces at Rome, were given to his brother, Don Carlos, king of the two Sicilies, and some of the finest statues and paintings in the museum of Naples are derived from that inheritance. The Farnese palace at Rome, which belongs to

the king of Naples, is considered the finest among the numerous palaces of that city. The Farnesina or smaller mansion on the opposite or right bank of the Tiber is known for the beautiful frescoes of Raphael. The Orti Farnesiani occupy a great part of the Palatine, and include some remains of the palace of the Cæsars.

Among the various families which have owed their aggrandizement entirely to a papal ancestor, the Farnese attained the highest rank among Italian princes, and retained it the longest. It has also produced several cardinals, distinguished for their learning. (See Ciacconius, *Vitæ et Gesta summorum Pontificum et Cardinalium;* Moreri's *Dictionary*, art. 'Farnese;' and Affo's *Vita di Pier Luigi Farnese*, and the Italian historians of the 16th century.)

FARNHAM, a town in the parish and hundred of Farnham and county of Surrey, 9½ miles west by south from Guildford, and 38 miles south-west by west from London. The town, which is situated near the north bank of the Wey, consists of one principal street running east and west, and contains many excellent houses. Though not a corporation, it is governed by twelve masters or burgesses, from whom two bailiffs are annually chosen. These magistrates act under the bishop of Winchester, to whom they pay an acknowledgment of 12*d*. per annum, receive the profits of the fairs and markets, and hold every three weeks a court, which has power to determine all actions under forty shillings. Farnham once returned members to parliament. The church, which is dedicated to St. Andrew, was formerly a chapel of ease to Waverley Abbey, and appears to have been erected about the beginning of the sixteenth century. The tower is substantially built, and has a small turret at each corner. In the interior there are some handsome monuments, and a fine painting of the twelve apostles forms the altar-piece. The vicarage is in the diocese of Winchester; patron the archdeacon of Surrey, and average net income 430*l*. The other public buildings are a market-house, a free-school, and a good day-school supported by charitable contributions. The manor of Farnham was given by Ethelbald, king of the West Saxons, to the see of Winchester, to which it has ever since belonged. On the north side of the principal street, and on the summit of a hill, formerly stood a castle, built by Henry de Blois, brother of King Stephen, and bishop of Winchester. This fortress was destroyed by Henry III. It was re-built, and again destroyed during the civil war. After the Restoration Dr. Morley, bishop of Winchester, expended a considerable sum in erecting the present structure, which is of brick, covered with stucco, embattled, and of a quadrangular form. It contains a fine library, and some good paintings. Adjoining the castle is an extensive park, through which the little river Loddon flows. About two miles south-east of the town is Moor Park, once the seat of Sir William Temple. On the borders of the park is Waverley Abbey, a neat modern mansion, which derives its name from a monastery of Cistertian monks, the ruins of which are in the vicinity. Farnham is noted for its hop plantations. It had formerly some cloth manufactures. The great mart for the Farnham hops is Weyhill fair. The largest plantations are less than 60 acres. The average produce is about 6¼ cwt. per acre. According to the census of 1831, the population of the parish of Farnham was 5858. The market-day is Thursday. The fairs for horses, cattle, sheep, and hogs are held on Holy-Thursday, 4th June, and 13th November.

(Carlisle's *Topog. Dict.;* Stevenson's *Survey of Surrey;* M'Culloch's *Commercial Dict.; Beauties of England and Wales; Municipal Corporation Reports; Ecclesiastical Revenues Reports; Population Returns.*)

FARO in Italian and Spanish, *pharus* in Latin, *phare* in French, was the name given to light-houses in the Mediterranean. The first light-house, called Pharus, is said to have been that raised by Sostratus of Cnidus B.C. 283, on the island at the entrance of the new harbour of Alexandria, the island itself being called Pharos. [ALEXANDRIA, ANCIENT.] The name became afterwards an appellative for light-houses, and in some instances it has been given to the towns near which a light-house was built. Such, for instance, is the town of Faro, in Algarve. Torre di Faro, a light-house on Cape Pelorus, in Sicily, has given its name to the straits at the entrance of which it is placed, between Calabria and Sicily, and which the Italians call Faro di Messina. The united kingdom of the Two Sicilies is divided, with regard to its administration, into 'domini di quà del Faro,' meaning the continental part, and 'domini di là del Faro,' that is to say, the island of Sicily.

FAROE, FEROE, or FAROERNE ISLANDS, a group twenty-two in number, seventeen of which are inhabited; they are about 390 miles west of the coast of Norway, and about 200 north-west of the Shetland Isles, between 61° and 63° N. lat., and 8° and 6° W. long. They were discovered between the years 858 and 868 by some Norwegians, in the time of Harold Harfager, king of Norway, and at present belong to Denmark. Their whole area is estimated at about 494 square miles, and the population at about 5800.

These islands mostly consist of steep rocks, some of them rising gradually from the sea, by two or more sloping terraces, covered with a thin stratum of earth, which produces grass. Close to the sea the land consists in general of perpendicular rocks, from twelve to eighteen hundred feet in height. The most westerly island is Myggenaes, the most southerly is Suderoe, the most easterly are Svinoe and Fugloe, and the most northerly are Kalsoe and Videroe. The interior is composed of hills, usually separated only by narrow ravines, in which there are brooks or rivulets which are in general so swollen in the rainy season as to become impassable: there are no valleys of any extent. Some authors report that the greatest elevation in these islands is the basalt mountain Skaellingfield, in the south part of the largest of them, Stromoe, which is nearly the central island of the group, and divided by narrow straits from Vaagoe and Osteroe; this mountain is about 2240 feet high. Another writer mentions the Skattaretinel as being the highest, and states its elevation at 2816 feet. There are several lakes, among which the largest are the Soorvagsvatn in Vaagoe, which is three miles long, and the Sandsvatn in Sandoe: and there are some falls of water, the most considerable of which is the Fossa in Stromoe, which has a double fall, nearly 200 feet in height. Among the mineral springs the most esteemed is that of Varmakielde in Osteroe. The climate is very bleak, and the summer lasts only through the months of July and August: yet it seldom freezes more than one month in the year, nor are the harbours ice-locked except in very severe winters. Violent storms prevail at all seasons, which prevent the growth of any large trees, and compel the inhabitants to fix their dwellings between the hills. The soil is stony, and in many parts covered with earth only four inches deep. In some islands there are majestic groups of basalt formation, similar to the caves of Staffa. Neither the soil nor climate admit of any extended tillage; and the sudden variations in the temperature induce the cultivator frequently to gather in his crops in a half-ripe state, and dry them by artificial heat. They consist principally of barley and rye, the growth of which is scarcely adequate to the consumption; potatoes, parsnips, turnips, and carrots are partially raised, but it is extremely difficult to raise any other vegetable. Landt states the proportion of the cultivated to the uncultivated land to be about 1 to 60, and that the corn-fields are not more than from 8 to 12 feet in breadth. The pasture-lands are luxuriant, and the chief wealth of the islanders consists in their flocks, often containing from 300 to 500 sheep, which graze in the open air the whole year round, and yield wool of good quality. Horses of small stature, but strong, swift, and sure-footed, are bred in considerable numbers: the horned cattle are also diminutive, yet become exceedingly fat. Few swine are fed. The dog is in so much request, that his value is equivalent to that of a cow. Seal-catching, and the whale, cod, herring, and other fisheries are another main resource of the people. Independently of domestic animals, the islands contain only rats and mice. There is an immense number of wild-fowl, such as eider-ducks, swans, geese, pigeons, solan-geese, puffins, cormorants, plovers, &c.

Turf is used for fuel. Beds of coal were discovered in the island of Suderoe in 1709, and some mines have been opened from time to time; but the coals are of inferior quality, and the cost of working and transporting them has caused them to be abandoned. Copper is found in the island of Nolsoe. Jasper and opal are met with here and there.

The inhabitants are of Norman (or Norwegian) descent, and speak the Norwegian language with a Danish accent. They have in general handsome features, and are well made: those of the northern are taller, and have more elongated countenances than those of the southern islands. They are ingenious, peaceable, honest, hospitable, and simple in their manners. Their number in 1769 was 4775;

in 1782, 4409; and in 1801, 5265. Their food consists of milk, fish, mutton, poultry, wild-fowl, and barley groats; bread and salt are considered luxuries. Their clothing is of coarse woollen, woven by their own hands. They are either hereditary proprietors of the soil which they cultivate, or farm lands under grant from the crown, from which circumstances they have the respective appellations of Odelsbonde or Kongsbonde. Christianity was introduced among them about the year 1000; they now profess the Lutheran faith, and are divided into thirty-nine flocks, under the care of seven incumbents, who minister among them week by week in rotation, the service in their absence being performed by one of the elder parishioners. The amtmann, or bailiff, is at the head of civil affairs: in judicial matters the landvoigt, or judge, is assisted by sidesmen from each parish.

Ship-building and commerce have greatly improved since a free trade with Denmark was granted at the beginning of the present century. There are some mechanics and good shipwrights; woollen-yarns, cloths, and stockings are manufactured; and there are a few tanneries. The exports consist of hose and trowserings, fish, feathers, skins and hides, butter, tallow, train-oil, &c.: the imports, of grain, bread, malt, brandy, salt, hemp, iron, timber and deals, linen, &c. The whole revenues of the islands are said to be about 4000 dollars, or 900*l.*

The larger islands are Stromoe, 27 miles long and about 7 in breadth: its capital Thorshavn, on the south-east side of the island, is the seat of government, and has a neat wooden church, a Latin school, and a fort. The streets are exceedingly narrow. There are about 100 houses with as many families. Population about 1600. Osteroe, to the east of Stromoe, is in length about 20 miles, and in its greatest breadth about 10. It has two fresh-water lakes and several deep fiords, or inlets of the sea, on the eastern side. There is a curious basaltic hill about 420 feet high, consisting of pentagonal and octagonal columns, on a foundation of trap 300 feet in height; and at the N.N.W. point of the island there are two rocks, with the appearance of colossal statues, which are called Risin and Kiedlingen, and are 240 feet high. On the south-west side is a safe harbour, the Kongshavn. The population of Osteroe is about 1300. Sandoe, to the south of Stromoe, is about 13 miles long and 1½ broad: it has a large lake called Sandsvath, which abounds in trout, five villages, three churches, and is the residence of the Amtspropst, who is the head ecclesiastical authority. Suderoe, lying south of the preceding, is about 17 miles in length and 5¼ in its greatest breadth, and contains 10 villages and 6 churches. It is full of rocks and precipices. Population about 700. Punthavn, its port, is almost the only spot where there is a safe landing. Vaagoe, to the west of Stromoe, is nearly 13 miles long and about 5 broad. Its principal lake, Soorvaag, is the largest in the Faroe islands, and is full of trout. It has four churches, the parochial one being at Midvaag, a village and seaport. Myggenaes, to the west of Vagoe, is an inconsiderable island about three miles broad. The remainder of the 17 inhabited islands are Fugloe, Svinoe, Videroe, Bordoe, Konoe, Kalsoe, Kolter, Hestoe, Nolsoe, Skuoe, and the greater Dimon. (Landt's *Faroerne;* Thaarup's *Danske Stat;* Hassel's *Denmark.*)

FARQUHAR, GEORGE, was born at Londonderry in 1678, and received his education at the university of Dublin. Though he displayed talents at an early age he did not take any degree, but forsook his severer studies for the stage, and appeared at the Dublin theatre. He never however made any great figure as an actor, and having had the misfortune to wound a brother comedian with a real sword, which he mistook for a foil, he forsook the stage, being at that time only seventeen years of age. He accompanied the actor Wilks to London, and attracted the notice of the Earl of Orrery, who gave him a commission in his own regiment, which was then in Ireland.

Wilks exhorted him to try his powers as a dramatist. Accordingly in 1698 he produced his comedy of 'Love and a Bottle,' which was so successful as to encourage him to another effort. His 'Constant Couple,' which appeared two years afterwards, was played 53 nights in the first season, and was the cause of the favourable reception of a very indifferent sequel which he wrote under the title of 'Sir Harry Wildair.' In 1703 he produced a version of Beaumont and Fletcher's 'Wild-goose Chase,' under the name of the 'Inconstant,' which, though it had small success at the time, was occasionally played at the London theatres a very few years back. He was married in the same year, and getting into great difficulties was forced to sell his commission. Being deceived by a nobleman, who had promised to assist him, he was so deeply affected that he fell into a decline, and died in 1707. During his last illness he wrote his celebrated 'Beaux Stratagem.'

The appearance of Farquhar's comedies may be regarded as an important epoch in the history of the English drama. None of his celebrated predecessors bear any resemblance to him: he was the first of his period to write in an easy flowing style, equally removed from the pedantic stiffness of Congreve and the formal courtly viciousness of the Etherege school. Immoral and licentious as his plays may appear to readers of the present day, those who are conversant with writings of that time must acknowledge them to be considerably more pure than those of his contemporaries, if we except his first piece 'Love and a Bottle.' Let any one who is disposed to be severe upon Farquhar cast his eye for a moment over the gross works of Wycherly, or the obscene and filthy trash of Mrs. Behn; let him compare Farquhar's volatile and airy Sir Harry Wildair with the cold-blooded and brutal Dorimant, held forth by Etherege in the 'Man of Mode' as a model of what a gentleman should be, and then he will measure the former by a right standard. Farquhar attended more to character than most writers of the day: he introduced a variety of classes talking in appropriate language, while the persons of Congreve's drama were but an assembly of professed wits, and those of Etherege and others were only rakes, city dupes, unfaithful wives, and women of the town, most of them speaking pretty much alike. At all events their pieces were marked by only one distinction of character, that between the injurer and the injured, the former of whom was held up as a clever personage, and the latter made to talk like a fool.

It is singular enough that the critics regarded as Farquhar's chef d'œuvre a serious comedy called the 'Twin Rivals,' which has now sunk entirely into oblivion, or at best is only remembered by readers of the old English drama as containing a masterly though disgusting portrait of a procuress, under the name of 'Mother Midnight.' A neat edition of his works was published in 1736.

FARRANT, RICHARD, one of the highly-venerated fathers of English church music, was born in the early part of the sixteenth century. He was a gentleman of the chapel-royal in 1564, and subsequently organist and master of the choristers of St. George's chapel, Windsor. His death is supposed to have taken place about the year 1585. So long as solemn harmony of the purest and finest kind shall find admirers, so long will his service in G minor, and more especially his two anthems, 'Hide not thou thy face,' and 'Call to remembrance,' be productive of the most delightful emotions that can arise out of a love of art combined with religious feeling.

FARRINGDON, a town in Berkshire, in the hundred of Farringdon, and in the parish of Great Farringdon. It is pleasantly situated on an eminence, 36 miles north-west by west from Reading, and 69½ miles west by north from London. It is governed by a bailiff and inferior officers. The market-day is Thursday. There are three annual fairs, viz. on Old Candlemas-Day, Whitsun-Tuesday, and 29th October, besides a statute fair on the 18th October for hiring servants. The Saxon kings had a palace at Farringdon, wherein Edward the Elder died in 925; and a castle was built here during the wars in the reign of Stephen, by the earl of Gloucester, or his son, but was totally destroyed a few years after by Stephen. In 1202 this king founded at Farringdon a priory of Cistertian monks, subject to the abbey of Beaulieu in Hampshire, and here, according to a manuscript in the Bodleian Library, King Henry III., his queen, and Prince Edward passed a night, being entertained at the cost of the abbot of Beaulieu. The expense of the king's entertainment amounted to 100*s.* 6*d.*, the queen's to 75*s.*, and Prince Edward's to 5[illegible]*s.* 6*d.* This priory, like the castle above mentioned, has long since been entirely ruined, and no vestige is left of either of them. During the civil war Cromwell made an attack upon the town, which was successfully resisted by the garrison under Sir Marmaduke Rawdon, whose memory is commemorated by an inscription in the parish church. King Charles was at Farringdon after the second battle of Newbury. Near Radcot Bridge, about

three miles to the north of Farringdon, was fought the battle between Robert Vere, duke of Ireland, and the earl of Derby, afterwards King Henry IV. The parish church, which is dedicated to All Saints, is a large and handsome structure in the Gothic style, and contains many old monuments, described in Ashmole's 'Antiquities of Berkshire' (Lond. 1719). It has a low square tower, formerly surmounted by a spire, which was destroyed during the civil war. The vicarage is in the diocese of Salisbury, and its average net income is 265*l*. The parish of Great Farringdon is partly in the hundred of Farringdon and partly in that of Schrivenham. According to the population returns for 1831, the entire parish contained 3033 inhabitants, and 6910 statute acres. (Lysons' *Magna Britannia; Carlisle's Topographical Dictionary*; Ashmole's *Antiquities; Ecclesiastical Revenues Report*, &c.)

FARS, or FARSISTAN. [PERSIA.]

FARTHING. [MONEY.]

FARTHINGALE, or VARDINGALE, a hoop, a circle of whalebone formerly worn by ladies to spread the petticoat to a wide circumference. Strutt, in his 'Manners and Customs,' vol. iii. pp. 84, 86, tells us that among the men, early in the reign of Queen Elizabeth, the wearing of great breeches was carried to very absurd and ridiculous lengths; and the ladies, that they might not be behind-hand with the gentlemen in fantastical taste, invented the large hoop farthingales as a companion to the trunk-hose or breeches. The farthingale afforded the ladies a great opportunity of displaying their jewels, and the other ornamental parts of their dress, to the utmost advantage, and for that reason obtained the superiority over the closer habits and the more simple imitations of nature.

Bulwer, in his 'Artificial Changeling,' says, when Sir Peter Wych was ambassador to the Grand Signior from King James I., his lady was with him at Constantinople; and the sultaness, having heard much of her, desired to see her; whereupon Lady Wych, accompanied with her waiting-women, all of them neatly dressed in their great farthingales, which was the court-dress of the English ladies of that time, waited upon her highness. The sultaness received her with great respect; but wondering much at the extension of her hips, inquired if that shape was peculiar to the women of England; to which the lady replied, that the English women did not differ in shape from those of other countries; and, by explaining to her the nature of the dress, convinced the sultaness that she and her companions really were not so deformed as they appeared to be. (Strutt's *Habits of the People of England*, vol. ii. pp. 259, 260.)

The farthingale however, if not then, was at least subsequently worn through Europe. The French farthingale had the name of *Hausse-cul;* see Cotgrave. Lascells, in his 'Voyage of Italy,' 12mo., 1655, p. 96, says, 'I found all the great ladies here to go like the donnas of Spain in guardinfantas, that is, in horrible overgrown vertigals of whalebone;' and Pepys, in his 'Diary,' 4to. edit., vol. i. p. 144, notices the strangeness of those worn by the ladies who came over from Portugal with Charles the Second's queen. The hoop, the last remain of the farthingale in England, went out at the beginning of the reign of George IV.

FASCES. [CONSUL; DICTATOR.]

FASCICLE, in botany, is, strictly speaking, that kind of inflorescence in which the flowers are arranged in a flat-headed raceme or corymb, and begin to expand in the centre sooner than at the circumference. The term is however constantly applied to any collection of flowers or leaves in clusters at the end or on the sides of a branch; thus the leaves of the larch are called fasciculate.

FASCICULA'RIA. [MADREPHYLLIŒA.]

FASCINES are bundles of strong brush-wood, employed chiefly for the purposes of reveting the epaulements of batteries and covering the roofs of field-magazines or other blindages, but occasionally to increase the heights of trench parapets, and to make temporary roads over marshy ground.

They are formed by placing the rods side by side in a cradle made of trestles, and compressing them by means of two levers connected by a chain, which is passed round the bundle: the whole is secured by withs or binders, which are placed 18 inches asunder. Fascines are commonly about 8 or 9 inches in diameter, and, when made, are 18 feet long; but they are then, if necessary, cut by the saw into parts of any required lengths, which are generally 6 feet or 12 feet. A fascine of the longest kind is sometimes called a saucisson.

When fascines serve for the revetment of a battery, they are usually laid horizontally, one line above another, against the interior slope of the epaulement, to which they are attached by pickets driven through them into the earth.

FASCIOLA'RIA. [SIPHONOSTOMATA.]

FAST, abstinence from food, more particularly used for such abstinence as a religious observance; from the Anglo-Saxon *fæstan*.

Religious fasting has been practised in almost all ages and all countries. Moses appointed that of the Day of Expiation for the Israelites. Herodotus (ii. 40) and Porphyry give us details of the Egyptian fasts. Among the fasts of the primitive Christians, the greatest was that of Quadragesima, or Lent: but they likewise observed the *Jejunia quatuor temporum*, or fasts of the four seasons.

The fixed days appointed by the church of England for fasting are, first, the Forty days in Lent; second, the Ember days at the four seasons, being the Wednesday, Friday, and Saturday after the first Sunday in Lent, the Feast of Pentecost, September 14th, and December 13th; third, the three Rogation days, being the Monday, Tuesday, and Wednesday before Holy Thursday; fourth, all the Fridays in the year except Christmas-day. The 30th of January is observed as a fast, in repentance for the execution of Charles I.: and other days of fasting are occasionally appointed by royal proclamation. The Long Parliament appointed a fast on the last Wednesday of every month.

Lewis, in his *Antiquities of the Hebrew Republic*, has given from Maimonides many particulars of the Jewish fasts, for which the reader may also consult Ockley's translation of Leo Modena's *History of the Jews*, 12mo., Lond., 1707, p. 150, and D. Levi's *Rites and Ceremonies of the Jews*, 8vo., Lond., pp. 70, 71, 85, 120, 125. For those of the Greek church he may consult Leo Allatius, *De Ecclesiæ Occidentalis atque Orientalis, consensione*, and Ricaut's *Present State of the Greek and Armenian Churches, Anno Christi*, 1678, 8vo. Lond. 1679. For the Mohammedan fasts, Reland *De Religione Mohammedica*, 8vo., Tr. ad Rhen. 1717, ca. x. and D'Herbelot's *Bibliothèque Orientale*, p. 708. The distribution of the fasting days in the present church of Rome will be found in Bishop Challoner's *Garden of the Soul*.

FASTI were marble tables at Rome, on which were inscribed the names of the consuls, dictators, censors, and other principal magistrates of the republic. Fragments of these tables have been collected, and are ranged along the walls of one of the halls in the palace of the Conservatori on the Capitol. The deficiencies in the series of the consuls have been supplied by means of the historians, and by consulting monumental inscriptions. Several learned men in modern times have compiled Fasti, or chronological tables of the Roman consuls. Among the most learned and accurate of these compilers is Sigonio of Modena, who published his 'Fasti Consulares ac triumphi acti a Romulo rege ad Titum Cæsarem,' fol., 1559; with a dissertation 'de nominibus Romanorum,' a work of great erudition and exact criticism. Pighius published 'Annales Magistratuum et Provinciarum S. P. Q. R. ab Urbe condita,' fol., 1599. Labbe, in his 'Bibliotheca Nova,' published Fasti 'Consulares' out of a MS. of the college of Clermont. Other editions of the Fasti have been made from various sources. Between these lists occasional discrepancies occur as to the names of some of the consuls, and the particular years of their consulships; for, notwithstanding the labours of critics and antiquarians, there is still some uncertainty about Roman chronology. The word Fasti is often used as synonymous with the annals, or chronicles of a nation.

The Romans had another kind of Fasti, which they called 'Fasti minores,' a kind of almanacs, in which were registered the periodical festivals, games, official days for business, &c. Ovid wrote a poem explanatory of these Fasti, which he dedicated to Germanicus, and in which he described the origin of the festivals, and the recollections, either happy or calamitous, connected with the various days of each month. The poem, as we have it, is in six books, one for each of the first six months of the year; the rest is unfortunately lost.

FASTING. [ABSTINENCE.]

FAT. This substance varies in properties according to the animals producing it; in all cases however it is composed of two different kinds which differ as to their melting point; these are termed *olein* or *elain* and *stearin*. It is not however to be considered that the substances to which these names

are given are in all cases absolutely identical; they vary as to smell, taste, solubility in alcohol, &c., but all fats agree in being insoluble in water, and in not containing any azote, which is a common constituent of most other animal matter. It has not been decided whether the differences which exist in the properties of the various kinds of olein and stearin are derived from a real difference in their elementary composition, or are owing to an admixture of substances which have not as yet been separated from them. Chevreul has however found, that the olein of the fat of man, the sheep, and the hog, are so similar as to their composition, as to induce the belief that the difference depends upon some accidental admixture. There is nevertheless this difference between human fat and that of the sheep, that the stearin of the latter yields a certain quantity of stearic acid by saponification, whilst the former does not give a trace of it. This peculiarity may be explained by supposing the presence of another kind of stearin, which has not hitherto been separated. Olein and stearin may be separated by dissolving the fat in hot alcohol, from which the stearin separates on cooling: seven-eighths of the fluid are then to be distilled, and, on adding water to the residue, a mixture of a large quantity of olein and a small portion of stearin is precipitated; when this is treated with cold alcohol of sp. gr. 0·84, the olein is dissolved by it, and the stearin left; by distillation the alcohol is separated and the olein remains. We shall now notice the difference existing in the properties of some of the more remarkable kinds of fat.

Human fat varies a little according to the part of the body producing it; that from the region of the kidneys, after it has been melted, is yellowish and inodorous; it begins to concrete at 76° Fahr., and is solid at 64°; it dissolves in forty times its weight of alcohol of 0·821 when boiling, and on cooling stearin is deposited, which, after pressure in bibulous paper at 78°, is colourless, fusible at 122°, and may be cooled to 106° before it begins to congeal; its temperature, on account of the evolution of latent heat, then rises to 120°: 21·5 parts of this stearin are soluble in 100 parts of boiling anhydrous alcohol, the greater part of which separates in acicular crystals on cooling.

The *olein* of human fat is a colourless oily sweetish fluid, and remains so at 40°; at 60° its specific gravity is 0·913: 123 parts of this olein are soluble in 100 parts of boiling alcohol; on cooling to 170° the solution becomes turbid.

Ox fat.—When this has been fused it begins to solidify at 98°, and the temperature then rises, for a reason already mentioned, to 102°. Forty parts of boiling alcohol, of sp. gr. 0·821, dissolve one part of it; and it contains about three-fourths of its weight of stearin, which is solid, hard, colourless, not greasy, and of a granular crystalline texture; it fuses at about 112°, and may then be cooled to 102°, when, on congealing, it rises to 112°. It burns like white wax. Of this stearin about 15·5 parts are dissolved by 100 parts of anhydrous alcohol.

The olein of ox fat is colourless, nearly inodorous, and its specific gravity is 0·913; boiling alcohol dissolves nearly one-fourth more than its weight.

Sheep's fat (or *Mutton suet*) greatly resembles that of the ox; it is however whiter, and by exposure to the air acquires a peculiar odour. After fusion it congeals at a temperature varying between 98° and 102°; it dissolves in 44 parts of alcohol of sp. gr. 0·821. The stearin is white, translucent, and after fusion but imperfectly crystalline; about 16 parts are dissolved by 100 parts of boiling anhydrous alcohol; the olein of mutton suet, is colourless; its specific gravity is 0·913; and 80 parts of it are dissolved by 100 parts of anhydrous alcohol at 168°.

Hog's fat, or *hog's lard*, is a soft colourless solid, which fuses between 78° and 86°; its specific gravity at 60° is 0·938. By powerful and long continued pressure at 42°, between folds of blotting-paper, it is stated to yield $\frac{62}{100}$ its weight of colourless olein, of specific gravity 0·915; of this, 100 of boiling alcohol dissolve 123 parts the stearin of hog's lard is inodorous, solid, and granular, which, after fusion, remains liquid down to 100°, and then on congealing the temperature rises to 109°. It becomes acid by exposure to the air.

Goat's fat contains a peculiar fat, termed by Chevreul *hircin*, and to the presence of this its peculiar odour is owing, and which remains to a great degree with the olein when this is separated from the stearin; by particular management this fat yields hircic acid. [HIRCIC ACID.]

The *fat of birds.*—Goose fat is colourless, and of a peculiar taste and smell; after fusion it congeals at 80° into a soft solid of the consistence of butter. When subjected in bibulous paper to pressure at 30°, 100 parts are separable into 68 of olein, and 32 of stearin, fusible at 112°; the fat of ducks fuses at 76°, and yields 72 olein, and 28 stearin, fusible at 120°; turkey's fat is separable into 74 olein and 26 stearin, fusible at 112°.

The fat of insects has been but slightly examined, and does not offer any very remarkable properties: the fluid fats, whether of animal or vegetable origin, and which are usually termed OILS, will be considered under that head.

The olein and stearin of animal fats are highly useful and important substances in the manufacture of soap and candles; for the latter purpose stearin has been of late very advantageously employed and to a considerable extent as a substitute for wax.

The subjoined analyses of the stearin and olein of mutton suet may be taken as examples of the general constitution of these substances, and will show that their composition is less different than might be expected from their different properties:—

	Stearin.	Olein.
Hydrogen	11·770	11·090
Carbon	78·776	79·354
Oxygen	9.454	9·556
	100·	100·

FA'TA MORGA'NA, a name of uncertain derivation given to a very striking optical delusion which has been principally remarked in the Strait of Messina, between the coasts of Sicily and Calabria. It has been differently described by different observers, which we may attribute to the different states of the atmosphere at the periods of the respective observations. The indications both of the hygrometer and thermometer should have been carefully noted, in order to obtain a precise explanation according to the known laws of optics.

The images of men, of houses, &c. are occasionally seen from the coast, sometimes in the water, and sometimes in the air, or at the surface of the water. The same object has frequently two images, one in the natural and the other in an inverted position: the images of a single object are said also to be sometimes considerably multiplied.

In accounting for this phenomenon, it should be remembered that the mountains on both coasts of the strait nearly inclose a portion of quiescent or stagnant air, the temperature of which near the surface of the water is therefore easily raised above that of the surrounding objects. The rarer medium thus generated causes a depression in the places of the images, in the same manner that a denser medium would elevate them; and the secondary images formed between the air and water are necessarily inverse. The colours which are seen in hazy weather arise from the refraction of light through the small globules of vapour floating above the surface of the water, and would equally accompany any real object, as a ship, under the same circumstances. [MIRAGE.]

The remarks of Minasi, which have been so often copied, in explanation of this phenomenon, are unworthy of attention.

FATALISM. This term is used to express an article of philosophical religion, and usually signifies that the successive actions of mankind, and even the successive operations of the powers of nature, are under the guidance of some superior almighty power, so that these *successions* and the actions themselves are entirely independent of each other.* This doctrine has been embodied in all religious systems, though very different names have been given to the governing power. The Greeks called it *moira* or *ananke*, and the Romans called it *fate*; their mythology also mentions a Demiurgus, who had formed the gods. All the antient religions of Asia recognise a similar fate, something mightier than the gods, to whom it dictates laws; such, for example, as the alternating governments of Ormuzd and Ahrimanes in the Persian mythology, &c. Among the Hebrews the Pharisees were fatalists, the Sadducees materialists, and the Essenes deists. The old Germanic religion of Odin modified this Fate, and brought it nearer to the idea of the government of the world by a deity, identifying it with their highest god, Allfadur (Father of

* Many Psychian physicians (*i. e.* of mental maladies) of modern times maintain the exact contrary, that all the actions of mankind are the effects of circumstances, and that all successive consequences depend on these actions.

all). From this point fate changes to what is called predestination (in opposition to chance), which idea is only a mitigated fate, distinguished however from genuine fatalism in proceeding directly from God, and not from fate. This belief in predestination was taught by Mohammed, and his followers have retained it. Catholicism has no trace of this doctrine, but it is held by the Calvinists, and to a certain extent at least by the church of England.

The doctrine of fatalism, as is well known, has been frequently and effectively used both by antient and modern poets.

Intimately related to fatalism is the doctrine of the immediate and direct intervention of Providence in the government of the world. According to this doctrine the *consequences* of the actions of mankind depend wholly upon the actions themselves; God, however, is able so to conduct these consequences, that collectively they shall result in good, and conformably to his purpose. To comprehend this working precisely is impossible for man, since his mental powers are not sufficiently extensive, and this dogma must therefore be a matter of faith. This doctrine is held by many Christian sects, and in the Bible there are passages strongly in favour of such special intervention; for example, Matthew x. 29, 'Are not two sparrows sold for a farthing? and one of them shall not fall on the ground without your Father.'

The third or deistical interpretation of this doctrine teaches the complete non-intervention of the Deity in the affairs of the world or of mankind: we may also call this doctrine the doctrine of theological chance, which may still be consistent with that of physical necessity, according to Kant. The doctrine of physical necessity was advocated by Hobbes, and served for the foundation of the charges against him of deism and atheism.

If we consider these doctrines in a philosophical point of view we may come to the following results:—The theological theories of fatalism, predestination, the immediate government of God, and his non-intervention, evidently bear an analogical relation to the political systems of despotism, constitutional monarchy, and republicanism. Accordingly as every one may have grounds for being an adherent of one of these political systems, so may he also have grounds for being a follower of one of these theological views. According to the ideas and investigations of the author of this article, God may have positively fixed, before any creation of the world, the eternal ideas, or the relations of things to each other within the circle of which nature and human intelligence have to move. These ideas are (1) for nature, self-preservation, or continuance, of which the product is attraction, &c.; regularity, producing crystallization, &c.; and adaptation to purposes, producing organization, &c.; (2) for human intelligence, self-love, beauty and virtue. In so far as nature and humanity with all their efforts cannot move out of this sphere of ideas, so far fatalism and predestination exist. The efforts of nature to adapt means to ends, and the endeavours of the wise after virtue (or human happiness) appear to produce an ever-increasing progression, and in this sense they constitute an intervention of Providence—since nature being wholly bound, and God absolutely uncontrolled, man stands between both; so that though he is not absolutely free, yet he is free to work his ultimate ends out of himself; he is free whenever he acts morally, and he is not free whenever he acts immorally (or rather physically), and he may thus arrive at the consciousness that his state in another world entirely depends on himself. With this conviction every species of intervention would appear less harsh towards him, and without these grounds he may be doubtful whether any direct intervention exists with respect to worldly affairs.

An intervention of any other kind than that of God would lead to the doctrine of dæmons and spirits.

FATHER. [PARENT AND CHILD.]

FATHERS OF THE CHURCH is the name given to the early teachers and expounders of Christianity, who lived between the second and the sixth centuries of our era, and whose writings are looked upon as possessing considerable authority in matters of faith. The earlier, or 'primitive fathers,' as they are sometimes styled, to distinguish them from the fathers of the fourth and fifth centuries, and, who followed close upon the apostolical age, namely the age in which the Apostles lived and died, are generally reckoned as follows: 1st, Clemens Romanus, bishop of Rome, who died about A.D. 100, and of whom we have an interesting epistle to the church of Corinth. [CLEMENT I.] 2nd, Ignatius, bishop of Antioch, a disciple of the Apostles in his youth, was sentenced to death under Trajan, A.D. 107, and was taken to Rome to be executed, as he informs us in his epistles. He was exposed to the wild beasts in the amphitheatre. There are extant several of his epistles to various churches of the East, and one to that of Rome. His epistle to Polycarp is doubtful. 3rd, Polycarp, bishop of Smyrna, who is said to have conversed with St. John and other Apostles in his youth, and who suffered martyrdom A.D. 167, when he was nearly 100 years old. He is the author of an epistle to the Philippians, which has been printed repeatedly, and is given in Cave's 'Antiquitates Ecclesiasticæ,' vol. i. 4th, Justinus, a native of Neapolis, in Palestine, a man of considerable learning, and a follower of various sects of philosophers. Having embraced Christianity he came to Rome in the time of Antoninus, had a controversy with Marcion, an early heretic, and wrote an eloquent apology for the Christians, which he addressed to Antoninus, and which drew from that emperor a rescript favourable to the Christians. Justinus afterwards returned to the East, where he held a disputation with Tryphon, or Tarphon, a learned Jew: on his return to Rome he had a controversy with Crescens, the philosopher, of which Jerome (*De Scriptis*), and Tatianus, a disciple of Justinus, give particulars. His second apology for the Christians was addressed, as it is believed, to Marcus Aurelius: soon after which he suffered martyrdom at Rome. We have of him, besides his two apologies, a 'Parænesis ad Græcos,' 'Dialogus cum Tryphone Judæo,' 'Epistola ad Diognetum,' and a 'Liber de Monarchia Dei.' 5th, Theophilus, made bishop of Antioch about 169, died about the beginning of the reign of Commodus. There is extant by him a work in three books, addressed to Autolycus, a heathen friend of Theophilus, whom he endeavoured to convert to the Christian faith. 6th, Irenæus, a Greek by birth, and a disciple of Polycarp of Smyrna, came with Polycarp to Rome, and was thence sent to Lyon to assist the aged Photinus, bishop of that city, whom he succeeded A.D. 179. He wrote against the Gnostics and other heretics, and suffered martyrdom under Severus. He is called by Tertullianus 'a very inquisitive explorer of every kind of knowledge.' His principal work, written originally in Greek, but which has come down to us in a Latin translation, is styled 'Adversus Hæreses, seu de Refutatione et Eversione Falsæ Scientiæ, libri v.,' and is directed against the Gnostics. 7th, Clement of Alexandria, who was born about the middle of the second century, died about 220: left numerous works. [CLEMENS, TITUS FLAVIUS ALEXANDRINUS.] 8th, Cyprian, bishop of Carthage, born about the end of the second century, suffered martyrdom about 258. His works are numerous. [CYPRIAN, ST.] He has been confounded by some with Cyprian of Antioch, who suffered martyrdom under Diocletian. 9th, Origen of Alexandria, born A.D. 186, died about 254: wrote numerous works, some of which however contain notions which have been reprobated as heretical. [ORIGEN.] 10th, Gregory, called Thaumaturgus, a native and afterwards bishop of Neo Cæsarea, in Cappadocia, and a disciple of Origen, died soon after the Council of Antioch, which he attended A.D. 264: we have of him a 'Metaphrasis in Ecclesiastem,' a 'Brevis Expositio Fidei,' an 'Epistola Canonica,' and a panegyrical oration to his master Origen, on leaving his school; to which the latter replied by an interesting letter, which is printed in his works. 11th, Dionysius, bishop of Alexandria, also a disciple of Origen, was banished under Valerian to the deserts of Libya, but was restored to his see under Gallienus, was engaged in controversy with Sabellius, Nepos, and Paul of Samosata, and died A.D. 265. Of his numerous writings only fragments remain. 12th, Tertullianus of Carthage, lived under S. Severus, and died at a very advanced age, under Alexander Severus. He is one of the most copious of the Fathers of the Latin church. In the latter part of his life he fell into the errors of the Montanists. [TERTULLIANUS.]

We now come to those Fathers of the Church who flourished in the fourth century, after Christianity had become the religion of the Empire, an age which may be styled the Augustan age of ecclesiastical literature, for the number and the merits of the writers whom it produced. Some account of most of these fathers and their works is given under their respective heads. They are generally ranged in two classes—fathers of the Greek or Eastern

Church, and fathers of the Latin Church. The former are: 1st, EUSEBIUS of Cæsarea, who died A.D. 340; his works give him a place among the fathers, notwithstanding the obloquy which his dubious conduct in the Arian controversy drew upon him. 2nd, ATHANASIUS, bishop of Alexandria, who died in 371. 3rd, Basilius, called the Great, bishop of Cæsarea, in Cappadocia, in the reign of Valens, one of the most eloquent of the Greek fathers, and whose works have been published repeatedly both in Greek and in a Latin translation. 4th, Gregorius Nazianzenus, the friend of Basilius, and for a time patriarch of Constantinople, who afterwards abdicated and ended his days in voluntary banishment A.D. 389. His style is remarkable for a certain poetical imagery which distinguishes him from his brethren. 5th, Gregory, bishop of Nyssa, in Cappadocia, the brother of Basilius, died about 396; he distinguished himself in the Arian controversy. 6th, CYRIL, bishop of Jerusalem, who died A.D. 386, wrote 18 books of sermons and other works. 7th, CHRYSOSTOM, ST. JOHN, patriarch of Constantinople, died in banishment A.D. 407. 8th, EPHIPHANIUS, bishop of Salamis, in Cyprus, died in 403. 9th, CYRIL, bishop of Alexandria, who died A.D. 444, was the great opposer of Nestorius concerning the Incarnation. To the above must be added Ephraim the Syrian, deacon of Edessa, who died about 378, and whose works have been published in the original text by Assemani.

The Fathers of the Latin Church are—1st, LACTANTIUS, who died A.D. 316. 2nd, Hilarius, bishop of Poictiers, who died about 368. He was much concerned in the controversy against the Arians, and wrote several books against Constantius, who patronized them. 3rd, AMBROSE, archbishop of Milan, died in 397. 4th, JEROME, the translator of the Bible, died A.D. 420. 5th, AUGUSTIN, bishop of Hippo, died A.D. 430. With Augustin the list of the great fathers of the church is generally considered as terminating, although this title has been also bestowed on some subsequent prelates and theologians; but these, such as Bernard, Thomas Aquinas, &c., are more properly distinguished by the name of doctors of the church.

The study of the Fathers is interesting not only to theologians, but to those who would examine carefully the philosophy and the state of society in their time. They are now much studied in the Protestant universities of Germany.

FATHOM. [MEASURES.]

FATIMIDES, the name of a race of kings, who assumed the title of caliphs, and reigned for many years over the north of Africa and Egypt. They obtained the name from the pretensions of the founder of the dynasty, Abu Mohammed Obeidallah, who asserted that he was descended from Fatima, the daughter of Mohammed and wife of Ali. The Arabic historians however generally deny the truth of this assertion; and many of them say that his grandfather was a Jew or of the Magian religion. The princes of this family were also called the Aliades, in consequence of their descent, real or pretended, from Ali.

1. Obeidallah, the first Fatimide caliph, was born A.D. 882. Having incurred the displeasure of Moktafi, the reigning Abasside caliph, he was obliged to wander through various parts of Africa, till, through fortunate circumstances, he was raised from a dungeon in Segelmessa (A.D. 910) to sovereign power. He assumed the title of Mahadi, or 'director of the faithful,' according to a prophecy of Mohammed's that in the space of 300 years such an individual would arise in the west. He subdued the princes in the north of Africa, who had become independent of the Abassides, and established his authority from the Atlantic to the borders of Egypt. He founded Mahadi on the site of the antient Aphrodisium, a town on the coast of Africa, about a hundred miles south of Tunis, and made it his capital. He became the author of a great schism among the Mohammedans by disowning the authority of the Abassides [ABASSIDES], and assuming the title of Emîr al Mûmenîn, 'prince of the faithful,' which belonged exclusively to the caliphs. His fleets ravaged the coasts of Italy and Sicily, and his armies frequently invaded Egypt, but without any permanent success.

2. Caiem succeeded his father A.D. 933. During his reign an impostor, Abu Yezid, originally an Ethiopian slave, advanced certain peculiar doctrines in religion, which he was enabled to propagate over the whole of the north of Africa, and was so successful in his military expeditions as to deprive Caiem of all his dominions, and confine him to his capital, Mahadi, which he was besieging when Caiem died.

3. Mansour succeeded his father (A.D. 946) when the kingdom was in a state of the greatest confusion. By his valour and prudence he regained the greater part of the dominions of his grandfather Obeidallah, defeated the usurper Yezid, and laid the foundations of that power which enabled his son Moez to conquer Egypt.

4. Moez (A.D. 955) was the most powerful of the Fatimide caliphs. He was successful in a naval war with Spain, and took the island of Sicily; but his most celebrated conquest was that of Egypt, which was subdued by his lieutenant A.D. 972. Two years afterwards he removed his court to Egypt, and founded Cairo. (See D'Anville's *Mémoires sur l'Egypte*, p. 132.) The name of the Abasside caliph was omitted in the public prayers, and his own substituted in its place; from which time the great schism of the Fatimide and Abasside caliphs is more frequently dated than from the assumption of the title by Obeidallah. The armies of Moez conquered the whole of Palestine and Syria as far as Damascus. The Arabic historians greatly extol the virtues of this caliph.

5. Aziz (A.D. 978). The dominions recently acquired by Moez were secured to the Fatimide caliphs by the wise government of his son Aziz, who took several towns in Syria. He married a Christian woman, whose brothers he made patriarchs of Alexandria and Jerusalem.

6. Hakem was only 11 when he succeeded his father, A.D. 996. He is distinguished even among oriental despots by his cruelty and folly. His tyranny caused frequent insurrections in Cairo. He cruelly persecuted the Jews and Christians, and burnt their places of worship. By his order the church of the resurrection at Jerusalem was destroyed (A.D. 1009). His persecution of the Christians led them to appeal to their brethren in the West, and was one of the causes that led to the crusades. His folly induced him to become the founder of a new religion, and to assert that he was the express image of God. He was assassinated in consequence of the intrigues of his sister, and was succeeded by his son

7. Dhaher (A.D. 1021). He was not so cruel as his father, but was addicted to pleasure, and resigned all the cares of government to his vizirs. In his reign the power of the Fatimide caliphs began to decline. They possessed nothing but the external show of royalty: secluded in the harem, they were the slaves of their vizirs, whom they could not appoint and dared not disobey. In addition to the evils of misgovernment, Egypt was afflicted in the reign of Dhaher with one of the most dreadful famines that ever visited the country.

8. Mostanser (A.D. 1037) was only nine when he succeeded his father. The Turks invaded Syria and Palestine in his reign, took Damascus and Jerusalem (A.D. 1076), where the princes of the house of Ortok, a Turkish family, established an independent kingdom. They advanced to the Nile with the intention of conquering Egypt, but were repulsed.

9. Mostali (A.D. 1094), the second son of Mostanser, was seated on the throne by the all-powerful vizir Afdhal. The government was entirely in the hands of Afdhal during the whole of his reign. The invasion of Asia Minor by the crusaders (A.D. 1097) appeared to Afdhal a favourable opportunity for the recovery of Jerusalem. Refusing to assist the Turks against the crusaders, he marched against Jerusalem, took it (A.D. 1098), and deprived the Ortok princes of the sovereignty which they had exercised for twenty years. His possession of Jerusalem was however of very short duration, for it was taken in the following year (A.D. 1099) by the crusaders. Anxious to recover his loss, he led an immense army in the same year against Jerusalem, but was entirely defeated by the crusaders near Ascalon.

10-13. The reigns of Amer (1101-1129), Hafedh (1129-1149), Dhafer (1149-1154), Faiez (1154-1160), contain nothing worthy of notice. During their reigns the power of the Fatimides rapidly decayed.

14. Adhed (1160) was the last caliph of the Fatimide dynasty. At the commencement of his reign Egypt was divided into two factions, the respective chiefs of which, Dargham and Shawer, disputed for the dignity of vizir. Shawer implored the assistance of Noureddin [NOUREDDIN], who sent an army into Egypt under the command of Shiracouh, by means of which his rival was crushed. But becoming jealous of Noureddin's power in Egypt, he solicited the aid of Amauri, king of Jerusalem, who marched into Egypt and expelled Shiracouh from the country. Noureddin soon

sent another army into Egypt under the same commander, who was accompanied by his nephew, the celebrated Saladin. [SALADIN.] Shiracouh was again unsuccessful, and was obliged to retreat. The ambition of Amauri afforded shortly afterwards a more favourable opportunity for the reduction of Egypt. Amauri, after driving Shiracouh out of the country, meditated the design of reducing it to his own authority. Shawer, alarmed at the success of Amauri, entreated the assistance of Noureddin, who sent Shiracouh for the third time at the head of a numerous army. He repulsed the Christians, and afterwards put the treacherous vizir to death. Shiracouh succeeded to his dignity, but dying shortly after, Saladin obtained the post of vizir. As Noureddin was attached to the interests of the Abassides, he gave orders for the proclamation of Most-hadi, the Abasside caliph (A.D. 1171), and for depriving the Fatimides of the caliphate. Adhed, who was then on a sick bed, died a few days after, ignorant, as it is said, of his loss.

(Mill's *History of Muhammedanism*, pp. 134-143; Mill's *History of the Crusaders*, vol. i.; D'Herbelot's *Bibliothèque Orientale*, articles 'Fathemiah,' 'Obeidallah,' 'Hakem,' 'Adhed,' 'Saladin,' &c.; Gibbon's *Decline and Fall*, cc. 57, 58, 59.)

FAULT. [MINING.]

FAUN, FAUNUS, was the name given in the Roman mythology to the gods or genii of the woods, corresponding with the Panes of the Greek mythology. The Fauni were supposed to be the descendants of Faunus an old mythical king of Latium, who resided in the forest Albunea with his wife Fauna or Fatua, near the pond of sulphureous water, which is between Rome and Tivoli; both were gifted with the faculty of prophesying. In subsequent ages the forest of Albunea continued to be the Delphi of Latium; the oracles were delivered by a voice issuing from its recesses. (Virgil, *Æneid*, vii. 82, &c.) Several statues in the Italian and other museums are believed to represent Fauni; among the most remarkable are those in the gallery of Florence, and a very handsome one in the museum of the Capitol. The sleeping Faun of the Barberino is now in the gallery at Münich.

FAUSSE-BRAYE, a name given to the rampart which is sometimes formed on the exterior of and parallel to that which constitutes the principal enceinte of a fortress.

In the antient fortifications a bank of earth was frequently raised in the ditch, nearly or quite contiguous to the wall of stone or brick surrounding the place, in order to protect the latter against the battering-engines of the besiegers; and the Italian engineers of the sixteenth century make mention of a detached wall of masonry similarly situated, which seems to have been intended for a like purpose. This was then called a *fossa-brea*, and, subsequently, by the French engineers, a *fausse-braye*; the first term indicating a covering work in the ditch, and the other simply a secondary or advanced rampart.

In and immediately before the time of Vauban the fausse-braye constituted the exterior part of the general rampart of a fortress; its terreplein, or upper surface, was situated a little above the level of the natural ground, and it carried a parapet for the protection of the defenders. The terreplein and parapet of the interior part of the rampart were several feet higher than those of the fausse-braye, and the interval between the two parapets was sometimes broad enough to allow room for artillery.

A good indication of the nature of this work may be obtained from the lower flanks of the bastions at Portsmouth, and, in order to render the example complete, it is merely necessary to suppose their parapets continued along the curtains and before the faces of the bastions.

The fausse-braye, thus formed, was intended for the defence of the ditch and covered way by a closer and more grazing fire than that of the principal rampart; but the enfilading fire to which the parts in front of the bastion were liable, and the destructive effects of the shells and grenades thrown into the work by the enemy, rendered it impossible for the defenders to remain in it at the time when their services were most required; it also afforded to the enemy some facilities in escalading the rampart. On account of these defects, this kind of fausse-braye has been long since suppressed, and the use of it in defending the ditch is supplied by the tenaille. [BASTION, *Fig.* 1, p. 17.] It should be observed however that Carnot and other French engineers have recently proposed constructions which may be considered as partial revivals of the fausse-braye, but with circumstances which appear to render the work free from the defects above mentioned.

FAUST, DR., a German scholar in the beginning of the fifteenth century, who is not, as is frequently supposed, the same person as Fust, the assistant of Guttenberg. The popular traditions of Northern Germany give very strange accounts of this man, which are somewhat confirmed by contemporary chroniclers, and represent him as having been in the possession of supernatural secrets, of a magic cloak, and other conjuring apparatus: he was said to have commanded the elements, and to have performed the greatest wonders, with the aid of his associate the devil, who at last carried him off. The simple fact is, that Dr. Faust being far in advance of his contemporaries in the physical sciences, made experiments, the results of which must have appeared superhuman to the narrow understandings of the people. But the poetical personification of the character which has gradually developed itself is much more interesting than the historical personage. Some of the greatest poets of Germany have represented Faust as a man inflamed by the most ardent desire for knowledge, who, after having devoted himself for many years to intense study, arrives at the conviction that the depths of truth are inaccessible to the human understanding. The despair of a mind thus disappointed, and the fiction of the use of magic to get admission to the forbidden regions of knowledge, impart to this character a particularly romantic charm. The idea itself is very old, and may be clearly traced to a primitive age. The circumstance that the wandering Punch and Judy showmen, those rude fathers of the drama in Germany, and even in France, have for centuries made, and are still making, the subject of Dr. Faust's deeds and descent to hell the favourite entertainment of their auditors, proves how well adapted this character is to dramatic action. In modern times, Lessing, the originator of German dramatic art, undertook to dramatise the subject; it was an undertaking grand in conception and plan, but unfortunately it has remained a fragment. The same idea however was taken up by Göthe, the greatest poet that Germany has yet produced. The following are the leading features of Göthe's work:—Faust, doctor and professor in all the faculties, highly admired for his wisdom, carries in his breast the conviction of the insufficiency of his knowledge to reach the fountain of truth. Accordingly he has recourse to magic. At his command appears the Erdgeist, the symbol of the original power which vivifies all matter, directs its motions, and its organic conformation and action. The spirit proceeds to explain to Faust its mode of creation and of action; but the limited human understanding is incapable of conceiving the immensity of the spirit, who disappears and leaves Faust in despair. Faust now resolves to release himself by death from all material forms, and to enter the secret regions of knowledge. But the moment he puts the deadly cup to his lips, the tolling of bells, the sound of the organ, and sweet chanting fall on his ears, and bring back to his mind such charming recollections of infancy and of earthly delights, that he cannot summon resolution to shake off the chains of existence. While he is still irresolute and doubtful, in the comfortless weariness of all human knowledge, the devil appears (the negative and destructive principle in opposition to the vivifying and creating), and Faust, recollecting his impotence when in presence of the Erdgeist, resolves to enter into a compact with the reprobate spirit; not with the expectation of satisfying his longing after knowledge, for he knows that the human mind, notwithstanding its narrow limits, rises higher and is more closely allied to truth than the evil spirit; neither is it his intention to obtain enjoyment by his agency, as the pleasures of the world have no charm for the man who is eager after truth; but the object which Faust contemplates in this union is constant uninterrupted activity. To be continually agitated by the conflict of the ever-changing elements of life is the only thing which can offer any compensation to man for knowledge which is denied. But whoever deserts the province of inquiry and plunges into the stream of life is unavoidably drawn into the vortex of sensuality, and as soon as the intellect of man loses its empire, he is carried into the abyss of material existence. This is the fate of Faust. The first volume of the work, published about twenty years previous to the second, leaves Faust degraded and sunk in sensuality, and struggling in vain to emerge from it. Instead of following up the conflict of the two opposing principles (the one spiritual and vivifying, the other mate-

rial and destroying), and of exemplifying the triumph of the former clearly and impressively, Göthe, who was then far advanced in years, gave shortly before his death, in the second volume (in which his glowing genius manifests itself most conspicuously), only mystical and fragmentary hints, instead of the forcible exposition of which the character is capable. The same subject has been dramatically treated by Klingemann and Röder, but their productions are far beneath Göthe's.

FAUSTI'NA, ANNIA, was the daughter of Annius Verus, præfect of Rome; she married Antoninus before his adoption by Hadrian, and died in the third year of her husband's reign, 36 years of age. She left only one surviving child, named Faustina. The historians have represented her conduct as very licentious. [ANTONINUS PIUS.]

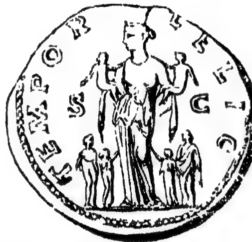




Coin of Faustina the Elder.
British Museum. Actual Size. Copper. Weight, 346¼ grains.

FAUSTI'NA the Younger, daughter of the preceding, married her cousin Marcus Aurelius, and died, A.D. 176, in a village of Cappadocia at the foot of Mount Taurus, on her husband's return from Syria. She is represented by Dion and Capitolinus as even more profligate in her conduct than her mother, and yet Marcus in his *Meditations* (i. 17) extols her obedience, simplicity, and affection. Her daughter Lucilla married Lucius Verus, whom Marcus Aurelius associated with him in the empire, and her son Commodus succeeded his father as Emperor. [AURELIUS, MARCUS.] J. Marchand (*Mercure de France*, 1745) and Wieland have attempted to clear this princess of the imputations against her character.





Coin of Faustina the Younger.
British Museum. Actual Size. Copper. Weight, 395½ grains.

FAUVETTE. [SYLVIADÆ.]
FAVASTRÆA. [MADASTRÆA.]
FAVERSHAM. [KENT.]
FAVO'NIA. [MEDUSA.]
FAVORI'NUS. [PHAVORINUS.]
FAVOSITES. [MILLEPORIDÆ.]

FAWKES, GUY. During the latter years of the reign of Queen Elizabeth the Protestants, who, since the death of Mary, had so increased in numbers and in power as to govern the kingdom as they would, endeavoured, by the severity of laws enacted against Roman Catholics, and by continual oppression, to extirpate that religion from England. 'Not only were the Catholics forbidden to use the rites and ceremonies of their own faith, but were required to attend upon the services of a church which, if conscientious and consistent, they were bound to abhor. If they refused or forbore to come to a Protestant church on the Sabbath, they were liable to a penalty of 20*l*. for every lunar month during which they absented themselves.' Every priest who said mass, and every person who heard it, was liable to a fine of 100 marks, and imprisonment for a year. 'The ministers of their religion, without whose presence they were precluded from the exercise of the sacraments and other rites, were in effect proscribed and banished; for by a statute passed in 1585 it was enacted "that all Jesuits, seminary and other priests, ordained since the beginning of the queen's reign, should depart out of the realm within forty days after the end of that session of parliament, and that all such priests or other religious persons ordained since the same time should not come into England, or remain there under the pain of suffering death as in case of treason." It was also enacted by the same statute that all persons receiving or assisting such priests should be guilty of a capital felony.' It may be truly said that these and other rigorous statutes were not at *all times* enforced; but they placed the whole body of the Catholics at the mercy of the Protestant government: for them therefore there was no liberty, personal or religious, but such as the privy council thought proper to allow; and with reference to their religion, the law gave them no rights, and afforded them no protection.

The facts, that James I., although himself a Protestant, was born of Catholic parents, had been baptized by a Catholic archbishop, and approved several of the ordinances of the Roman church, gave to the Catholics at his accession hopes of a revival of their liberties. At first, indeed, it appeared that their wishes would be realised, and the severity used toward them relaxed, for the fines paid by the recusants, which in the last year of Elizabeth had amounted to 10,333*l*., in the first year of James's reign scarcely exceeded 300*l*., and in the second they were little more than 200*l*. James however was no sooner firmly seated upon the throne than he overthrew all their expectations. In February, 1604, he assured his council that 'he had never any intention of granting toleration to the Catholics,' that he would fortify the laws against them, and cause them to be put into execution to the utmost.

We must refer to the 2nd vol. of 'Criminal Trials,' from which this article is extracted, for a fuller account of the enactments made at this time against the Catholics: sufficient has been said to show the cause of their discontent with the government, the king, and the Protestants in general. The design of blowing up the House of Lords with gunpowder at the opening of parliament, and thus destroying at a single blow the King, the Lords, and the Commons, was formed about the summer of 1604. The conceiver of this desperate and bloody vengeance was Robert Catesby, a Catholic, the son of Sir William Catesby, who had been several times imprisoned for recusancy. Catesby disclosed his scheme to John Wright and Thomas Winter, the former descended from a respectable family in Yorkshire, the Wrights of Plowland in Holderness: the latter from the Winters of Huddington in Worcestershire, where they had been in possession of estates since the time of Henry VI. At a conversation held between these conspirators, it was agreed that Winter should go over to the Netherlands to meet Velasco, constable of Castile, who had arrived at Flanders on his way to England, to conclude a peace between James and the king of Spain, and request him to solicit his majesty to recal the penal laws against the Catholics, and to admit them into the rank of his other subjects. Winter received no encouragement from Velasco that he would stipulate in the treaty of peace for the liberties of the English Catholics, and so returned to England, having in company Guido or Guy Fawkes, who, it was thought, would be of assistance in the business. Fawkes was a gentleman of good parentage and respectable family in Yorkshire; his father, Edward Fawkes, was a notary at York, and held the office of registrar and advocate of the Consistory Court of the Cathedral. Of his education and early history nothing is known; but having spent the little property that he derived from his father, he enlisted in the Spanish army in Flanders, and was present at the taking of Calais by the Archduke Albert in 1598. Soon after Winter's return to London, Thomas Percy, the relation and confidential steward of the Earl of Northumberland, joined the four conspirators already mentioned, and the following oath of secrecy was administered to each, kneeling with his hands placed upon the Primer:—'You swear by the blessed Trinity, and by the sacrament you now propose to receive, never to disclose directly or indirectly, by word or circumstance, the matter that shall be proposed to you to keep secret, nor desist from the execution thereof until the rest shall give you leave.' They then heard mass, and received the sacrament from Father Gerard in confirmation of their vow. Percy took the next step. He was a gentleman pensioner, and upon pretence that it would be convenient to him when in attendance in that capacity, he purchased of one Ferris the remainder of a short term which he had in the lease of a house adjoining the parliament house.

Fawkes, who was unknown in London, and had assumed the name of Johnson, acted as Percy's servant, and took possession of the house. Parliament was soon afterwards adjourned till the 7th of February, and the conspirators having first hired a house in Lambeth for the preparation of timber for the mine and a place of deposit for combustibles, agreed to meet in London about the beginning of November. The custody of the house in Lambeth was committed to Robert Keyes, the son of a Protestant clergyman in Derbyshire, but himself a Catholic; the oath of secrecy was administered to him also. The proceedings of the star chamber during the interval of their meetings so exasperated the conspirators that they became more eager than ever about the plot. Catesby and his confederates, according to a previous agreement, assembled in the house about the 11th of December, and a mine was immediately commenced. The stone wall, however, which separated them from the Parliament House being found three yards in thickness, Keyes and the younger brother of John Wright (who was enlisted as the others had been) were called in to assist, and the seven men were thus occupied until Christmas-eve without their ever appearing in the upper part of the house. During their laborious employment they had much consultation respecting the scheme to be adopted. It was supposed that Prince Henry would accompany the king to the Parliament House and perish there with his father. The Duke of York, afterwards Charles I., would then be the next heir, and Percy undertook to secure his person, and carry him off in safety as soon as the fatal blow was struck. If this scheme should fail, the princess Elizabeth was to be surprised and secured by a party provided in the country. It was the intention to proclaim one of the royal family as king. It was also arranged that Warwickshire should be the general rendezvous, and that supplies of horses and armour should be sent to the houses of several of the conspirators in that county, to be used as occasion might require.

In the midst of these deliberations Fawkes brought intelligence that the parliament had again been prorogued from the 7th of February to the 3rd of October following. The conspirators therefore separated for a time; and in the mean while John Grant of Norbrook in Warwickshire, and Robert Winter of Huddington, were sworn in among their number. In February (1604-5) their labours were resumed, and the stone wall nearly half broken through. One morning while working upon the wall, they suddenly heard a rushing noise in a cellar nearly above their heads. At first they feared they had been discovered; but Fawkes being despatched to reconnoitre, found that one Bright to whom the cellar belonged was selling off his coals in order to remove. Fawkes carefully surveyed this large vault situated immediately below the House of Lords, and perceived its fitness for their purpose. The difficulties connected with breaking through the wall, its thickness, the damp of the situation, for water was continually oozing through the stone work, and the danger of discovery from noise, disposed the confederates to abandon their operations, and to possess themselves of the cellar of Bright. The vault was immediately hired, and about twenty barrels of powder were carried by night from Lambeth: iron bars and other tools that had been used in mining were also thrown among the powder that the breach might be the greater, and the whole was covered over with faggots. Lumber of various kinds was placed in the cellar to prevent any suspicion of the curious or the watchful. In May, 1605, the preparations were complete: the conspirators having marked the door, in order that it might be seen if any one entered the vault, consented to separate; before their separation, however, it was proposed that an attempt should be made to obtain foreign co-operation by informing Sir William Stanley and Owen of the project. This was agreed to on condition of their being sworn to secrecy, and Fawkes was despatched to Flanders for the purpose of conferring with them. Sir Edmund Baynham was also sent on a mission to the pope, that when the news of the explosion arrived at Rome he might be prepared to negotiate on behalf of the conspirators, and to explain that the design of the plot was the re-establishment of Catholicism. Soon after Fawkes's return from Flanders the parliament was further prorogued from October to the 5th of November. These repeated prorogations alarmed the conspirators, and led them to fear that their project was suspected. Their alarms however having been discovered to be groundless, Catesby purchased horses, arms, and powder, and under the pretence of making levies for the archduke in Flanders, assembled friends who might be armed in the country when the first blow was struck. As considerable sums of money were necessary for these purposes, it was proposed to admit into the confederacy three wealthy men, Sir Everard Digby [DIGBY], Ambrose Rookwood of Coldham Hall in Suffolk, and Francis Tresham, the son of Sir Thomas Tresham of Rushton in Northamptonshire. These gentlemen were afterwards sworn in.

As the day of meeting of parliament approached, it was finally determined that Fawkes should fire the mine with a slow match, which would allow him a quarter of an hour to escape. Sir Everard Digby was to assemble a number of Catholic gentlemen in Warwickshire on the 5th of November under pretence of a hunting party, and Percy was to seize the prince of Wales, or the duke of York if the prince should go to the parliament house with the king. One subject of discussion only arose, whether and how the Catholic peers should be warned of their danger: each conspirator had friends, if not relations among them; but the danger of communicating the project to so large a number of persons was considered so imminent, that they despaired of saving all of them, and it was concluded that no express notice should be given them, but only such persuasion, upon general grounds, as might deter them from attending. Many of the conspirators were averse to this advice and angry at its adoption; and Tresham in particular, for his sisters had married Lords Stourton and Mounteagle. Indeed Tresham so passionately required that Lord Mounteagle should have warning of his danger, that very high words ensued; and when he was thwarted in his wishes, he hinted that the money which he had promised would not be forthcoming; and from this time he ceased to attend their councils.

On Saturday, the 26th of October, ten days before the meeting of parliament, Lord Mounteagle unexpectedly gave a supper in a house which he had not lately occupied. Circumstances have given rise to a belief that he was privy to the plot at the time that he invited his friends, and that the supper was only given as a convenient opportunity of discovering the conspiracy to them. Be this as it may, whilst he was at table a letter was brought to him by one of his pages, who stated that he had received it in the street from a stranger, who pressed its instant delivery into his master's hands. The letter ran thus:—'My lord out of the love i beare to some of youer frends have a caer of youer preservacion therefor i would advyse yowe as yowe tender youer lyf to devyse some exscuse to shift of youer attendance at this parleament for God and man hathe concurred to punishe the wickednes of this time, and thinke not slightlye of this advertisment but retyere youre self into youre contri wheare yowe may expect the event in safti for thowghe theare be no apparance of anni stir yet i saye they shall receyve a terrible blowe this parliament and yet they shall not seie who hurts them, this councel is not to be contemned because it may do yowe good and can do yowe no harme for the dangere is passed as soon as yowe have burnt the letter, and i hope God will give yowe the grace to mak good use of it to whose holy protection i commend yowe.' 'To the right honorable the Lord Mounteagle.' This letter has been ascribed to Anne, the daughter of Lord Vaux, to Mrs. Abington, Lord Mounteagle's sister, to Percy, and to others; but there seem greater reasons for believing that no one of these was the writer of it, but rather that Tresham was its author. It is a point, however, we have not room to discuss, and therefore must refer the inquiring reader to *Criminal Trials* (vol. ii. p. 66) for further remarks upon it.

On the same evening Lord Mounteagle showed the letter to several lords of the council, who with him agreed that no steps should be taken until the king returned from hunting at Royston. The contents of the letter and its communication to many of the council, as well as to the secretary of state, soon reached the ears of the conspirators; but though their danger was evident, and the vessel which was to convey Fawkes to Flanders was lying in the river, they made no attempt to escape. All suspected Tresham to be their betrayer, and he was accused by them, but he vehemently denied the accusation. Since they did not know accurately to what extent their proceedings had been divulged, they had still hope of effecting their design, especially as, upon examination, Fawkes found that the cellar was not watched, and had not been disturbed. When,

however, they heard that on the 31st of October the letter had been shown to the king, their hope diminished and their fears increased. Some of the conspirators left London; others concealed themselves in an obscure lodging; all held themselves ready to start at a moment's warning. Fawkes alone, with the extraordinary courage which he had displayed throughout the transaction, took up his station in the cellar. Thus they passed three days of anxiety and suspense. On Monday the chamberlain, with Lord Mounteagle, commenced the search, which appears to have been somewhat strangely delayed. Their suspicions were excited both at finding that Percy was the occupier of a house of which he was known to make no use, and at the unaccountably large store of fuel which filled the cellars, and by the side of which a tall dark suspicious-looking man (Fawkes) was standing. They therefore gave orders to Sir Thomas Knevet, a magistrate in Westminster, to search the houses, the cellars, and the whole neighbourhood. The search was commenced, and about twelve o'clock on the night of the 4th Fawkes was seized as he came out of the cellar: matches and touchwood were found upon his person, a dark lantern with a lighted candle stood behind the cellar door, and under the faggots 36 casks of gunpowder. Fawkes at once avowed his purpose to the magistrate, and declared that 'if he had happened to be within the house when he took him, he would not have failed to have blown him up, house and all.' His courage and composure were not disturbed when he was examined before the king and council. He gave his name as John Johnson, the servant of Thomas Percy, declared his intention to blow up the king, lords, and bishops, and others who should have assembled at the opening of the parliament, refused to accuse any one as his accomplice, and upon being asked by the king how he could enter upon so bloody a conspiracy against so many innocent persons, declared that 'Dangerous diseases require a desperate remedy.'

After having received the news of the apprehension of Fawkes, it was agreed by the conspirators, who had assembled at Ashby Ledgers, to take up arms with the few followers they could collect, and to endeavour to excite to rebellion the Roman Catholics in the counties of Warwick, Worcester, and Stafford, together with those of Wales. This scheme was immediately adopted; arms and horses were seized upon, and different parties despatched over the country. But all their efforts were in vain [DIGBY], and the failure of the project so complete, that their proceedings served no other purpose than to point them out as members of the confederacy. A party of the king's troops pursued some of the conspirators to Holbeach, and here an obstinate defence was made, in which the two Wrights, Percy, and Catesby were killed, and Rookwood and Thomas Winter wounded. The others were eventually taken. Tresham died a natural death in prison, and on the 27th January, 1606, eight persons, namely, Robert Winter, Thomas Winter, Guy Fawkes, John Grant, Ambrose Rookwood, Robert Keyes, and Thomas Bates, were tried at Westminster by a special commission, for being concerned in the powder-plot. Sir Everard Digby was arraigned and tried separately for the same crime. Upon the trials no witness was orally examined: the evidence consisted of the written declarations of Digby's servant and of the prisoners themselves. There is reason to believe that Fawkes was tortured in order to make him confess more fully. All the prisoners were found guilty, and upon all the sentence of death was passed. Care was taken to render their execution, which took place on the following Thursday and Friday, as solemn and impressive as possible.

Of the implication of the Jesuits in this conspiracy we shall speak in the article GARNET.

The atrocity of the design and the extent of the mischief contemplated form the principal features of the gunpowder-plot. It is also remarkable for having been imagined and contrived, not by needy and low-born adventurers, but by gentlemen of good family and for the most part ample fortune. Its effect continued long to be felt; for it not only determined the feeble and wavering mind of the king against the Roman Catholics, but prejudiced the whole nation against them to such an extent, that not only were the severe acts then in force against them left unrepealed, but others equally harsh were enacted. (Abridged and extracted from *Library of Entertaining Knowledge, Criminal Trials*, vol. ii.)

FAWN. [DEER, Vol. viii. p. 358.]

FAYAL is one of the Azores or Western Islands. It is situated in 38° 30′ N. lat. and near 29° W. long., and is more than 24 miles long from east to west. Like the other Azores, it has an uneven surface, and in some places the hills rise into mountains. Though the soil is rocky, it is very fertile, and vegetation is favoured by the mildness of the climate. The island grows firs and palms, pine-apples, oranges, cabbages, and potatoes; but the principal object of agriculture is the vine. In good seasons, from 8000 to 10,000 pipes of wine are exported, chiefly for America; oranges are sent to England and corn to Brazil. Its harbour, Horta, is the best in the whole group. Boats alone can land on the adjacent islands of Pico, Flores, and Corvo; and the produce of these islands is accordingly brought to Fayal for exportation. Fayal has also the advantage of lying directly in the track of European ships homeward bound from South America and India, and is visited by many vessels for provisions or refitting. Its capital, Horta, sometimes but improperly called Fayal, is a pretty little town with 5000 or 6000 inhabitants; it is the place of export for the product of this and the neighbouring islands.

FAYETTE, MARIE MAGDELAINE DE LA VERGNE, Countess de la, was the daughter of an officer and a nobleman of Provence. She took lessons in Latin of Ménage and Father Rapin, and soon made great progress in that language. In 1655 she married Francis Count de la Fayette, and her house became the rendezvous of the literary men and the wits of the age. Lafontaine, Ménage, Huet, and Segrais were her most frequent visitors. The Duke de la Rochefoucault, celebrated for his wit and his licentiousness, became acquainted with her, and she boasted afterwards of having contributed to his reformation. Madame de Sevigné, in her letters, speaks highly of the moral character of Madame de la Fayette as well as of her talents. She wrote several novels which obtained a high reputation at the time, being the first of the kind in France written in a natural style, and free from the exaggerations and affectation of former novelists. She also wrote:—1. 'Mémoires de la Cour de France, pour les années 1688-89,' which contain some curious particulars. 2. 'Divers Portraits de quelques Personnes de la Cour,' being true sketches of living characters. 3. 'Mémoires de Henriette d'Angleterre,' not so interesting as the other two. Madame de la Fayette left also other memoirs of contemporary history which have not been published. Her printed works were collected and published together in 8 vols. 12mo., Paris, 1786, with a notice of her life, and again in 1804, together with the works of Madame de Tencin. Her correspondence was published in 1805. Madame de la Fayette died in 1693.

FAYETTE, GILBERT MOTTIER, Marquis de la, was born on the 1st of September, 1757, at Chevagnac, near Brioude, in the present department of the Haute Loire. He married at the age of sixteen Mademoiselle de Noailles d'Ayen, and his wife's relations offered him a place at court, which he refused. When the American revolution broke out, La Fayette, who was deeply interested in the cause, made an offer of his services to Benjamin Franklin, which being accepted, he armed a vessel at his own expense and landed at Charlestown in April, 1777. He fought as a volunteer at the battle of the Brandywine on the 11th of September, 1777, in which he was wounded. Congress having given him a brevet of major-general, he served in the north under Washington's orders, and was at the battle of Monmouth in June, 1778, and afterwards received the thanks of Congress for his gallant conduct, and the present of a valuable sword. In 1779 he returned to France, the government of that country having acknowledged the independence of the American States, and he obtained assistance in men and money, with which he returned to America. In 1780 he commanded the advanced guard of Washington's army; and in the following year he was intrusted with the defence of Virginia against Lord Cornwallis. Being joined by Washington and Rochambeau, he contributed to the operations in consequence of which Lord Cornwallis was obliged to capitulate at York Town. After the surrender of Cornwallis he returned to France for fresh reinforcements, but the peace of 1783 prevented his sailing back to America. He however revisited that country some years after, and was received in triumph by its grateful citizens, whose independence he had powerfully contributed to establish. After his return to France he travelled through Germany, and was received with marked distinc-

tion by Frederick the Great and Joseph II. of Austria. In 1787, being returned a member of the Assembly of Notables, he advocated the abolition of the lettres de cachet and of state-prisons, and he supported the claims of the Protestants of France, who were still labouring under civil disabilities. He also supported the convocation of the States-General of which assembly he was returned a member. In this capacity he supported Mirabeau's motion for the removal of the military from the neighbourhood of the capital; and in July, 1789, he proposed the first declaration of rights, which formed the basis of the following constitution. In the same month, being appointed commandant-general of Paris, he organized the national guard, and distributed among the soldiers a tricoloured cockade, namely, blue and red, the colours of the commune of Paris, and white, the colour of the lilies of France, and these became thenceforth the national colours. On the 15th of October of that year he marched at the head of the national guard to Versailles, where a tumultuous multitude had preceded him: he was probably the means of saving the lives of the king and the royal family on that occasion, by escorting them back to Paris, whither the Assembly also removed their sittings. He voted in the Assembly for the institution of the jury, for the suppression of hereditary nobility, for the political equality of all citizens, &c. Mistrusting the effects of individual ambition in revolutionary times, he moved and carried a resolution to the effect that the same person should not have the command of the national guards of more than one department at once. He himself refused the appointment of lieutenant-general of the kingdom. In conjunction with Bailly he instituted the club of the Feuillans, which supported the constitutional monarchy on a popular basis. After the king's forced return from the flight of Varennes, La Fayette supported the decree by which the king was restored to the exercise of his regal office on swearing to the new constitution. Upon this the republican party broke out into an insurrection, which La Fayette and the national guards put down on the Champ de Mars. Soon afterwards La Fayette gave in his resignation and retired into the country; but the war of the first coalition having begun, he was appointed to the command of the army of Flanders, and he defeated the allies at Philippeville and Maubeuge. He was however hated by the Jacobins at Paris, and mistrusted by the court. On the 16th of June, 1792, he wrote a strong letter to the Legislative Assembly, denouncing the plots of those men 'who, under the mask of democratic zeal, smothered liberty under the excess of their license.' He soon after repaired to Paris, and demanded of the Legislative Assembly the punishment of the outrages committed against the king at the Tuileries on the 20th of June. But the republican party was already preponderating in that Assembly, and La Fayette found that he was not safe in Paris. It is said that he then proposed to the king and the royal family to take shelter in his camp at Compiègne, but the advice was rejected by Louis, or rather by those around him, who placed all their confidence in the duke of Brunswick and the Prussians.

On the 30th of June the Jacobins of Paris burnt La Fayette in effigy in the Palais Royal. La Fayette having returned to his camp, publicly expressed to his officers his disapprobation of the attack on the Tuileries of the 10th of August, and on the 15th of that month he arrested the commissioners sent by the Legislative Assembly to watch him. Upon this he was outlawed, and was obliged to cross the frontiers with a few friends. His intention was to repair to some neutral country, but he was arrested by the Austrians, and carried to the fortress of Olmutz, in Moravia, where his wife and daughter soon after joined him, to console him in his confinement. He remained in prison for five years, and was released at last by the treaty of Campo-Formio; but not approving of the arbitrary conduct of the Directory he repaired to Hamburg, and did not return to France till after the 19th Brumaire, 1799. Here he found himself again in opposition to Bonaparte's ambition, and he voted against the consulship for life, refused all employment under that chief, and retired to the country, where he applied himself to agricultural pursuits.

In 1815 he was returned to the house of representatives convoked by Napoleon on his return from Elba. After the defeat at Waterloo he spoke strongly against any attempt to establish a dictatorship, and moved that the house should declare its sittings permanent, and that any attempt to dissolve it should be considered as treason When Lucien appealed to the Assembly not to forsake his brother in his adversity, La Fayette replied with great animation:—'We have followed your brother through the burning sands of Syria, as well as to the frozen deserts of Russia; the bleached bones of two millions of Frenchmen scattered all over the globe attest our devotion to him; but that devotion,' he added, 'is now exhausted, as his cause is no longer the cause of the nation.

After the forced dissolution of the Legislative Assembly by the allied troops, La Fayette protested against that violence, and retired to his country residence at Lagrange. In 1818 he was returned after a great struggle to the Chamber of Deputies for the department of La Sarthe. During that and the following session he spoke in favour of constitutional liberty and against exceptional laws, but to no effect.

In 1824 he went on a visit to the United States, where he was received with the greatest enthusiasm in every state of the Union. In 1830, being in the house of deputies, he was foremost among the members who resisted the arbitrary ordonnances of Charles X. He then called out again the national guards and placed himself at their head. Faithful to his old constitutional principles, he proposed Louis Philippe as king of the French, stating his conviction that a monarchy based on popular institutions was the government best suited to France. During the trials of the ex-ministers he exerted himself zealously to save them from popular fury. Of the subsequent differences between him and Louis Philippe concerning views of foreign and domestic policy several versions have been given. La Fayette died at Paris on the 20th of May, 1834, and his funeral took place on the 28th of the same month, being attended by numerous friends, foreigners as well as French, peers and deputies, who showed the high sense which they entertained of the personal character of the deceased. He was interred, according to his own directions, in the same grave with his wife. He was one of the few public men whose character passed unscathed through the ordeal of half a century of revolutions. (Cloquet, *Souvenirs de la Vie Privée du Général La Fayette*, 8vo., 1836; Sarrans le Jeune, *La Fayette et la Révolution de* 1830, and a *critical notice* of the latter work in the *Foreign Quarterly Review*, No. XX., October, 1832; and the historians and biographers of the French Revolution.)

FAYETTEVILLE. [CAROLINA, NORTH.]

FAYOUM. [FAIOUM.]

FEALTY. [DISTRESS, p. 29; FEUDAL SYSTEM.]

FEAR is the dread or apprehension of any object or event, which object or event however is sometimes purely imaginary. Absence of fear is resolution or courage. Absence of all *dread* would be a repose of the soul, for which, as it cannot exist, the language affords no term. Dread is a minor species of affright or terror, but of a more enduring nature. The highest and most excessive state of terror amounts to a total deprivation of consciousness, and produces death. If these definitions are correct, a smaller degree of terror would consist in a quickly-passing unconsciousness. Dread would consequently consist of a succession of recurring periods of unconsciousness, alternating with excessive rapidity with intervals of consciousness, of which only the total impression is perceived (as in the vibratory strokes of vibrating bodies in acoustics): this total impression constitutes dread. Fear is only distinguished from dread through the imminence of danger, and thence a fearful or a dreadful or frightful object are nearly synonymous. The longer these periods of unconsciousness endure in a state of fear or dread, the more powerful are the feelings, till at length (as in drowning persons, or in children who are much alarmed) total unconsciousness ensues, and, according to circumstances, death.

If these definitions of fear and dread are psychologically correct, they serve to explain all the consequent physiological phenomena. A violent blow upon the head deprives us of consciousness, by occasioning an interruption in the regular functions of the brain, through which recollection ceases, and unconsciousness ensues. Any horrible appearance to or impression upon the organs of sight may produce a similar effect; for if the nerves of vision are so powerfully affected as to re-act upon the brain, the regularity of its action is similarly destroyed and the same effects are produced as by a blow. It is the same with all the other senses; and it is worthy of remark, that these feelings (of fear or dread) evidently heighten the powers of the imagination. If therefore a powerful affection of the

visual nerve will produce absolute terror, so may a smaller degree of terror produce the more lasting sensations of dread or fear, *i. e.*, interchanging pauses of consciousness and unconsciousness. With the brain and spinal marrow the nerves are connected which lead to the lungs, to the stomach, to the muscles, and other parts of the body. It is therefore not surprising that dread or fear should display itself in shortness of breath, irregularity of pulsation, an increased action of the heart, a disordered stomach, sickness, and powerlessness of the limbs.

Fear may be also produced through a disordered action occasioned by some local affection of the heart or the lungs, or through plethora or disorders of the blood, or through a general sickness, as in the cholera.

FEAR, CAPE. [Carolina, North.]

FEAR, CAPE, RIVER. [Carolina, North.]

FEAST or **FESTIVAL**, an anniversary day of civil or religious joy: from the Latin *festum.*

Among the Jews, the feast of Trumpets, that of Expiation, the feast of Tabernacles, the feast of Dedication, the Passover, Pentecost, and the feast of Purification, were the principal. The modern Jews have a few more, but they are of later institution.

The Greeks, and more especially the Athenians, had an abundance of festivals. Such were the Aglauria, in honor of Aglauros, the daughter of Cecrops; the Artemisia in honor of Diana; the Dionysia in honor of Bacchus; the Eleusinia in honor of Ceres; and the Panathenæa in honor of Minerva.

The Roman festivals were of two kinds; first, those which were fixed or stated; secondly, those which were appointed annually on a certain day by the magistrates or priests. Of the former kind were the Agonalia, the Faunalia, Matronalia, Cerealia, Saturnalia, &c., through the several months; the latter were the Feriæ Latinæ or Latin holidays, the Paganalia in honour of the tutelary gods of the rustics, the Sementivæ in seed-time, and the Compitalia. Dion (ix. 17) observes that so large a portion of the year was taken up with sacrifices and holidays, to the great loss of the public, that Claudius abridged the number.

The Mohammedans, in addition to their weekly feast, or sabbath, which is observed on Friday, have two festivals of a more solemn kind; the feast of Victims, celebrated on the 10th day of the last month of their year, and the feast of Bairam.

With us, some of our festivals are immoveable, and others moveable. The immoveable festivals are Christmas Day, the Circumcision, the Epiphany, Candlemas or the Purification, the Annunciation of the Virgin Mary or Lady Day, All Saints, and All Souls. The greater part of what are called Saints' Days have long ceased to be celebrated, except in the Calendar. The principal of the moveable feasts, and that by which the rest are guided, and from which they keep their proper distance, is Easter; the others are Palm Sunday, Good Friday, Ash Wednesday, Sexagesima, Ascension Day, Pentecost, and Trinity Sunday. The four feasts from which leases are usually dated, and quarterly payments made, are Lady Day, 25th March; the Nativity of St. John Baptist, June 24th; Michaelmas Day, September 29th; and Christmas Day, December 25th.

The reader who would know more of the English festivals at an earlier period, may consult the *Liber Festivalis* printed at Westminster by W. Caxton, sm. fol., 1483, which consists chiefly of a collection of Sermons, preached to the common people upon them. See also *Festa Anglo-Romana*, 12mo., London, 1678; and *Historia Sacra, or the Holy History, giving an exact and comprehensive account of all the Feasts and Fasts of the Church of England*, 2nd edit., 8vo., Lond.

FEBRUARY, the second month of the year. Its name is derived from *februo*, to purify or cleanse. The Lupercalia were celebrated in this month. (Ovid, *Fasti*, ii. l. 19, 31.) The Saxons called it *Sol-Monath*, because the sun's meridian altitude visibly increases in it.

February was not in the Calendar of Romulus. It was added to the year by Numa, who gave it the twelfth place in the Calendar. The Decemviri transferred it to the place in which it now stands. (Ovid, *Fasti*, ii. l. 47.) Numa assigned twenty-eight days to it in order that the sum of the year might be an uneven number, according to a Pythagorean fancy. (Macrob. *Saturnal.* li. i. c. 13.) In an ordinary year February has twenty-eight days; in bissextile, or leap-year, it has a twenty-ninth, or intercalary day. [Bissextile.]

FE'CAMP, a town in France, in the arrondissement of Hâvre, at the outfal of a small river on the coast of the department of Seine Inférieure, 116 miles north-west of Paris, and 40 from Rouen, the capital of the department. Fécamp is said to have existed in the Roman times as a place for collecting tribute, and to have been thence termed Fisci Campus, whence its modern name. But it owes its historical celebrity to an abbey for nuns founded A.D. 664, or thereabout, by Waning, count or governor of the Pays de Caux. The Normans under Hastings, A.D. 841, dispersed the nuns and levelled the abbey with the ground. The abbey church was rebuilt A.D. 988, by Richard I., duke of Normandie. The abbot of Fécamp subsequently became one of the most powerful ecclesiastics of Normandie; three suffragan abbots owned his superiority; he presented to one hundred and thirty benefices, and his abbey had the enormous yearly income for that period, of 40,000 crowns. There was a noble conventual library well stored with MSS., and containing among its archives many deeds and charters of William the Conqueror and his successors. Casimir, king of Poland, upon the voluntary abdication of his throne, retired to this abbey. Fécamp was also the occasional residence of the dukes of Normandie.

Mr. Dawson Turner, who visited Fécamp in the year 1818, thus describes it:—'Fécamp, like other towns in the neighbourhood, is imbedded in a deep valley, and the road, on approaching it, threads through an opening between hills "stern and wild," a tract of "brown heath and shaggy wood," resembling many parts of Scotland. The town is long and straggling, the streets steep and crooked; its inhabitants, according to the official account of the population of France, amount to 7000, and the number of its houses is estimated at 1300, besides above a third of that quantity which are deserted, and more or less in ruins.' The population in 1832 was 8869 for the town, or 9123 for the whole commune. The church of the abbey mentioned above is yet standing; it is 370 feet long, and 70 feet high; the transept, including 'the Chapel of the Precious Blood,' is 120 feet long, and the tower 200 feet high. Some circular chapels round the choir are probably parts of the church as rebuilt by duke Richard near the close of the tenth century, but the rest of the building is all in the pointed style, and scarcely any part is earlier than the end of the twelfth century; the cloister is modern. The church of St. Etienne, one of the ten parochial churches which Fécamp had before the Revolution, has a very imposing exterior.

The inhabitants are engaged in fishing, manufactures, and commerce; a few years since (Dupin, *Forces Productives de la France*, 1827) they had eighteen vessels engaged in the cod and whale fishery, and one hundred and forty-eight in the mackerel, herring, and other smaller fisheries. The decline of this branch of industry has led many of the fishermen to engage in manufactures. The manufactures are of cotton goods, in spinning, weaving, and dyeing, in which near 1400 workmen are occupied; also linens, leather, articles of clothing for the colonies, iron wares, kelp, rape-oil, and refined sugar. The trade is chiefly coasting-trade, or the supply of the English smugglers with tea, brandy, hollands geneva, and other contraband articles. The port, which is formed by the mouth of the small river which falls into the sea at Fécamp, has been much improved. Courses of instruction are given on navigation, geometry, and mechanics applied to the arts; there are a tribunal de commerce, or commercial court, an exchange, and an hospital. Limestone is quarried, and chalk refined in the neighbourhood.

FECIA'LES, in antient Rome, were the messengers or heralds of war and peace; they belonged to the order of the priesthood, and their persons were held sacred even by enemies. When the Romans had or pretended to have grievances against another state, they sent one of the feciales, who, clad in his solemn robes, entered the obnoxious territory or town, and in the presence of the assembled people, or of the magistrates and rulers of the country, stated the complaints of the Romans, and asked for reparation. A certain time, generally thirty days, was allowed for deliberation and for returning an answer, at the end of which the fecial herald came again, and if the answer was not satisfactory, he took to witness Jupiter and the other gods that he had religiously performed his duty, and that it was now the

business of the Roman senate and people to decide upon the question. On his return to Rome he declared to the senate the result of his mission, and told them that they might now declare war if they thought proper. If war was decided upon, the fecial herald went again to the limits of the hostile state, and there, in presence of witnesses, appealing to Jupiter and the other gods celestial and terrestrial, he protested against the injustice of that people and their obstinacy in refusing reparation, and declared that nothing now remained for Rome but to seek satisfaction by its own arms: he then threw a spear within the hostile boundaries, upon which war was considered as begun. When a treaty of peace or alliance was to be concluded, the presence of the feciales was likewise required, as with the Romans all political conventions partook of a religious character. The Etruscans and other antient Italian nations had also their feciales. This institution had a beneficial effect, insomuch as it tended to humanize the system of warfare, and to prevent sudden and unexpected aggressions. (Pitiscus, Hildebrandus, and the other writers on Roman antiquities.)

FE'CULA, or FÆCULA. [STARCH.]

FECUNDATION OF PLANTS. [IMPREGNATION OF PLANTS.]

FEDERATION. A federal union of sovereign states may be most easily conceived in the following manner:—

We will suppose that the sovereign power in any number of independent states is vested in some individual in those several states. These sovereign persons may agree respectively with each other and with all not to exercise certain functions of sovereignty in their several states, and to transfer these functions to be jointly exercised by the contracting sovereign persons. The consequence of such a compact will be that the contracting sovereign persons in their joint capacity will become sovereign in each state and in all the states. The several sovereign persons having for the time surrendered to the joint body certain powers incident to their several sovereignties are no longer severally sovereign in their several states. The powers surrendered to the joint body may be determined by written contract, the interpretation of which belongs to the joint body, yet in such a manner that there can be no valid interpretation unless the sovereign persons are unanimous; for if any number or majority could bind the rest, they might, by interpretation, deprive the several contracting persons of all the powers reserved to them by the contract. It follows also from the terms of the union, that any one party can withdraw from it at pleasure, and, as far as he is concerned, dissolve the union; for the essence of this union is the continuing consent of all.

This is the simplest possible form of a supreme federal government; one in which the contracting sovereign powers are individuals, and in which the sovereign persons in their aggregate capacity exercise the functions of sovereignty. Such a federation may never have existed, but any federation that does exist or can exist, however complicated it may seem, is reducible to these simple elements.

If the sovereign powers, instead of being in individuals, are in all the people of the respective states, the only difference will be that the functions of sovereignty, which in the first case we supposed to be exercised by the individual sovereigns in their joint capacity, must, in this case, be delegated to individual members of the sovereign body. The citizens of the several sovereign states must in the first instance of necessity delegate to some of their own body the proper authority for making the federal contract or constitution; and they must afterwards appoint persons out of their own body, in the mode prescribed by the federal contract, for executing the powers intrusted by the federal contract to persons so appointed. Thus the individuals who form the federal contract act therein severally as the agents of the sovereign states from which they receive their commission; and the individuals appointed to carry into effect the terms of the federal contract are the ministers and agents of that sovereign power which is composed of the several sovereign states, which again are composed of all the citizens. By whatever name of President, Senate, House of Representatives, or other name, the agents of the sovereign power are denominated, they are only the agents of those in whom the sovereign power resides.

When the sovereign power is so distributed, the question as to the interpretation of the federal contract may in practice be more difficult, but in principle it is the same. No one state can be bound by the interpretation of the rest, for if this were once allowed there would be no assignable limit to the encroachments of the states exercising sovereign power in their aggregate capacity. It is a clear consequence of the nature of the compact, whether the several sovereign powers are nations or individuals, that each contracting power must exercise its judgment on the interpretation of the instrument to which it is a party, and that no interpretation from which any power dissents can, consistently with the nature of the compact, bind that power.

In the case of complete dissent or disagreement by any one power, the contract is, by the very nature of its terms, at an end; for the contract being among sovereign powers, they cannot severally as such yield *obedience* to another sovereignty, which results from the aggregation of their several sovereign powers: their acts in their joint capacity must be acts of complete consent.

If the sovereign power in such a federal union has delegated the power of interpreting the written instrument of union to certain judiciary authorities, appointed under the federal compact for the purpose of carrying its provisions into effect, the several sovereign powers must still exercise, either by their legislatures or their judiciary authorities, their right to judge of the correctness of the interpretation, just as much as if the several sovereign persons, in the case first supposed, themselves exercised the functions of sovereignty in the supreme federal government.

What is commonly called the general government of the United States of North America is an example of a federation or federal government, or a supreme federal government. The contracting parties were sovereign states (the sovereignty in each state being in the citizens), which in their aggregate capacity formed a supreme federal government. The ministers for carrying into effect the federal government are the president and congress, and the judiciary of the United States. By the preamble to the constitution it is in fact declared that the 'people of the United States' are the contracting parties.

The fifth article of the constitution provides that 'The congress, whenever two-thirds of both houses shall deem it necessary, shall propose amendments to this constitution, or, on the application of the legislatures of two-thirds of the several states, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes, as part of this constitution, when ratified by the legislatures of three-fourths of the several states, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the congress; provided, &c., and that no state, without its consent, shall be deprived of its equal suffrage in the senate.' From this article it is clear that the framers of the constitution did not fully comprehend the nature of the supreme federal government; for it is assumed by this article that the several states may be bound without their unanimous consent, which is contrary to conditions essentially implied by the nature of the union. This article involves also the inconsistency that the sovereign in any state may bind his successors: if the case of a federation of individual sovereign persons had been that to be provided for, the impossibility of the provision would have been apparent; but the impossibility equally exists when the contracting sovereign powers are respectively composed of many individuals, for the abiding consent is still the essence of the union that has been formed.

This is not the proper place to discuss the advantages and disadvantages of a supreme federal government, nor to examine into its stability. That it is necessarily deficient in one element of stability, namely in there being a necessity for all the consenting parties to continue their consent, is evident: in this respect it is like a partnership for an indefinite period, which may at any time be dissolved by any one of the partners. Such a power, which is incident to the nature of the partnership, so far from being an objection to it, is a great advantage. So long as all the parties agree, they have the benefit of the union: when they cannot agree, they take instead of it the benefit of the separation.

It is also foreign from our purpose to consider what is the tendency, in a union like that of the United States, resulting from the powers placed in the hands of the President and Congress by the States acting in their aggregate capacity. If such power were placed in such hands by sovereign persons originally severally sovereign in their respective states, as in the case first supposed, the vigi-

lance of these persons in their aggregate capacity, though somewhat less than the vigilance of a single sovereign person, would probably prevent any undue assumptions of power on the part of those to whom they had delegated certain fixed powers. But the further the several sovereigns, who in their aggregate capacity form this federation, are removed from those to whom they delegate certain powers, and the more numerous are the individuals in whom this aggregate sovereignty resides, the greater are the facilities and means offered to, and consequently the greater is the tendency in, their ministers and agents practically to increase those powers with which they may have been intrusted. In their capacity of ministers and agents, having patronage at their command and the administration of the revenue, such agents may gradually acquire the power of influencing the election of their successors, when their own term of office is expired, and may thus imperceptibly, while in name servants, become in fact masters. That there is such a tendency to degenerate from its primitive form in all social organization, as there is in all organized bodies to be resolved into their elements, seems no sufficient reason for not forming such union and deriving from it all the advantages which under given conditions it may for an indefinite time bestow on all the members of such federation.

Those who wish to examine into the nature of the North American Union and the party questions which have arisen out of the interpretation of the federal constitution may consult the essays of Jay, Hamilton, and Madison in the *Federalist*, the *Journal of the Philadelphia Convention*, published in 1819, and Tucker's *Life of Jefferson* (London, 1836), where they will find ample reference to other authorities.

A supreme federal government, or a composite state, is distinguished by Austin (*Province of Jurisprudence determined*) from a system of confederated states: in the latter 'each of the several societies is an independent political society, and each of their several governments is properly sovereign or supreme.' It is easy to conceive a number of sovereign powers, such as the German States, assembling and passing resolutions which concern all the members of the confederacy, and yet leaving these resolutions to be enforced in each state by its own sovereign power. Such a union therefore differs essentially from a supreme federal government, which enforces its commands in each and all the states. As to the existence of a written constitution, as it is called, in the one case and a mere compact in the other, that makes no essential difference, for the federal constitution, as we have shown, is merely articles of agreement, which only derive their efficacy from the continued assent of all the members that contribute in their aggregate capacity to form the sovereign power in such federation.

As to a system of confederated states, Austin adds: 'I believe that the German Confederation, which has succeeded to the antient empire, is merely a system of confederated states. I believe that the present diet is merely an assembly of ambassadours from several confederated but severally independent governments; that the resolutions of the diet are merely articles of agreement which each of the confederated governments spontaneously adopts; and that they owe their legal effect, in each of the compacted communities, to laws and commands which are fashioned upon them by its own immediate chief. I also believe that the Swiss Confederation was and is of the same nature. If, in the case of the German or of the Swiss Confederation, the body of confederated governments enforces its own resolutions, those confederated governments are one composite state, rather than a system of confederated states. The body of confederated governments is properly sovereign: and to that aggregate and sovereign body each of its constituent members is properly in a state of subjection.'

FEDOR IVANOVICH, the last tzar of Moscow, of the dynasty of Ruric, ascended the throne in 1584, after the death of his father, the celebrated tyrant Ivan Vasilevich. He was weak in body and in mind, but the affairs of the government were conducted by the talented Godoonoff during his reign, which was marked by some events that produced a decisive influence on the destinies of the Russian empire. It was during Fedor's reign that the peasants of Muscovy, who had hitherto enjoyed personal liberty, and could pass from the estate of one landowner to that of any other who would grant them better conditions, were converted into serfs attached to the ground (servi glebæ adscripti). This change was introduced in 1592 by the instrumentality of Godoonoff, who adopted that measure in order to gain a party among the landowners. There had been previously to that epoch domestic slaves in Russia, but the predial serfs date only from that time. The Greek church of Moscow originally depended on the patriarch of Constantinople, who consecrated the Metropolitan of Moscow; but after the capture of Constantinople by the Turks, the supremacy of the Greek patriarch over the Muscovite church was almost destroyed. Jeremy, patriarch of Constantinople, arriving in 1588 at Moscow in order to collect alms for the erection of churches, was received with great honours by Fedor, who, being exceedingly devout, presented the head of the Greek church with rich donations. Jeremy acknowledged the kindness of Fedor by consecrating a patriarch of Moscow, which dignity lasted till the time of Peter the Great, who abolished it, and declared himself the head of the Russian church. The conquest of Siberia, which had been commenced under Ivan Vasilevich, was completed under Fedor, during whose reign Russia made the first attempt to extend its influence over the Caucasian regions. The khan of Crimea invaded Russia, and penetrated to the capital, but he was repulsed from the walls of Moscow in 1591. The reign of Fedor is also remarkable for many diplomatical relations with foreign courts, and particularly with that of England. The most important event of Fedor's reign was his attempt to get himself elected king of Poland in 1587. Fedor, or rather his prime minister Godoonoff, promised to the states of Poland and Lithuania, that if they elected him king, he would unite all the forces of Moscow with those of Poland, and conquer the Crimea for Moscow, and Wallachia, Moldavia, and Hungary for Poland. The proposed union would have easily created a power capable of accomplishing not only the projected but even much more extensive conquests. Fedor's proposals were readily accepted by the majority of the Lithuanians, and they found many partisans even amongst the Poles. He was on the point of being elected, when, fortunately for the repose of Europe, the overbearing conduct of the Muscovite ambassadors destroyed the hopes of Fedor, and Sigismund Vasa, prince of Sweden, was elected king of Poland. Fedor died in 1591, and with him ended the dynasty of Ruric on the throne of Moscow, his younger brother Demetrius having been murdered through the instrumentality of Godoonoff.

FEDOR ALEXEYEWICH, tzar of Moscow, the eldest brother of Peter the Great, ascended the throne after the death of his father Alexius Michaylowich, 1676, being only 19 years of age. His youth and delicate constitution did not prevent him from displaying remarkable talents and energy, and the strong will which he constantly evinced to improve the barbarous institutions of his country, and to introduce civilization into the Muscovite empire, may justify us in supposing that but for his death he might have accomplished what was afterwards performed by his brother Peter the Great. Fedor distinguished his reign particularly by putting an end to a most absurd custom which had acquired the force of law in Muscovy. According to this custom, called Mestnichestvo (literally *placeship*, from Mesto, place), no member of a great family could be put under the command of or give precedence to a person whose birth was considered inferior to his. All the noble families of the country were registered in a roll called *Razriad*, or *Arrangement*, and all the disputes which frequently arose about precedence, not only at the court, but even in active service, were settled by referring to this kind of herald's office. A natural consequence of such a preposterous system was confusion, and it frequently proved very detrimental to the public service; but it was so deeply rooted, that even the celebrated tyrant Ivan Vasilevich, who deluged Muscovy with blood and decimated its nobility, was unable to destroy the Mestnichestvo. Fedor abolished the absurd practice by very simple means: he assembled his boyards, or principal nobles, and having expostulated with them on the bad consequences of the above-mentioned custom, threw, in the presence of the assembly, all the rolls of the Razriad into the fire. This auto-da fé, which took place in 1681, extinguished for ever the system of the Mestnichestvo, and since that time the nobles of Russia have equal privileges. The nobility in Russia enjoy as a class many rights from which the other classes of the community are excluded, but neither antient family nor title legally gives in Russia any privilege to an individual belonging to the class of the nobles which any other mem-

ber of the same body does not possess. The genealogical records of the Muscovite nobles, which did not relate to their claims of precedence, were spared by Fedor, and even arranged in order by his command. Death prevented Fedor from attempting other reforms in his country; he died in 1682, at the age of 25.

FEE SIMPLE. [ESTATE.]

FEE TAIL. [ESTATE.]

FEELING. [TOUCH.]

FEES, certain sums of money claimed as their perquisite by official persons under the authority of various acts of parliament, and by prescription. The right to fees, as well as the amount payable in most cases connected with the administration of justice, has been regulated by several recent statutes.

Officers demanding improper fees are guilty of extortion. [EXTORTION.]

The rewards paid to barristers and physicians, attorneys and surgeons, for their several services, are called fees, which may be recovered by the two last-named by action; but barristers and physicians cannot recover their fees by any legal proceeding, on the ground that they are not capable of being fairly estimated in amount, and also because they are or ought to be paid in advance. [See COUNSEL; PHYSICIAN.]

FEHME, or FEHMGERICHT. After the crusades, when the spirit of chivalry had degenerated from its antient splendour, the German nobles retired to their gloomy castles, whence they darted, like birds of prey, upon the travelling merchants, or waylaid each other for the perpetration of every description of outrage. Murder, robbery, rape, abduction, went unpunished. Nor were these excesses confined to the laymen; the clergy, secular and monastic, casting off the rigid morals of their predecessors, plunged into license and debauchery. In the midst of general depravity and anarchy, the authority of the laws, both civil and ecclesiastical, gave way to force, which, in the hands of ignorance and rapacity, threatened society with dissolution. In order to check the audacity of those who, relying upon their power, thought themselves above the reach of the law, and for the protection of the defenceless and innocent, a secret tribunal was formed, called the sacred Fehme, or Fehmgericht. According to the best critical inquiries, there can be little doubt that the formation of this tribunal was due to Charlemagne after his conquest of Saxony. A division into counties, 'grafschaften,' formed part of the general organization which he then gave to Germany; each county had a 'freygraf,' free-count, and a 'schœffe,' sheriff, who, on certain days of the month, generally on Tuesdays, held a court for the administration of justice in the open air. According to the antient German custom, the spirit of which still breathes in the laws of England, no criminal proceedings could be had by a judge unless an information was previously lodged by the prosecutor. 'Wo kein klager ist, da ist kein richter;' 'where there is no accuser, there is no judge,' was a maxim of the old Saxon law. Charlemagne, having conquered the Saxons, endeavoured to establish Christianity by force, and punished all who would not profess the new religion; but being aware that no Saxon would betray his fellow-citizen for such an act of disobedience, he imposed on the sheriffs the duty of accusing and denouncing all those who would not profess Christianity. This obligation was afterwards extended to other crimes, as adultery, rape, administering of poison, conspiracy, and rebellion.

At the period of anarchy above alluded to, the schœffen, who were the traditional possessors of the secret orders of Charlemagne, being prevented by continual acts of violence from discharging their duties, resolved on forming a secret association for the vigorous enforcement of the laws.

The members of this tribunal, who called themselves Wissende, 'the Knowing Ones,' were chosen from the most moral, well-educated, and boldest members of the community. After the necessary inquiries into his previous course of life, the neophyte was summoned to attend a meeting of the schœffen, which was held at midnight in some secluded part of a forest, and opened with all the formalities of a court of law. He was required to kneel before the freygraf, his head uncovered, with his fore-finger on the sword, and to take the following oath:—'I swear to keep the secret from man and woman, from village and farm, from stick and stone, even from toad and frogs, or any other of God's creations, unless I have the permission of him who heads the holy Fehm. And I will not break my oaths for pleasure or pain, for pledge or dress, for silver or gold, or any other reason. I further swear to disclose to this holy chair, which presides at our sittings, every thing that concerns this secret tribunal, which I know to be true, or hear for truth from trustworthy persons.' As soon as the neophyte had pronounced this oath, he was informed that the object of the association was to uphold peace, virtue, and honour against the open or concealed enemies of the law; and as the interest of the order required that the schœffen of the different counties and principalities should be known to each other, they had adopted a sign consisting of four letters, S. S. G. G., the signification of which is still involved in mystery. The neophyte was further presented with a rope, which he was obliged to carry in his left sleeve, and also a dagger, on which the four above-mentioned letters were engraved, together with other symbols. Moreover he was charged with the duty of accusing before the secret tribunal all those who could not be successfully prosecuted before the ordinary courts, and of executing capital punishment whenever required by the society to perform this duty.

The mode of proceeding against the accused was as follows: If the author of a crime absconded, or his residence was unknown, the schœffe was required to write four summons, and post them on a cross road; but if the residence was known, the schœffe came at night, and nailed the summons with four nails, folded as a letter, containing an imperial farthing, on the man's door. He then rang the bell, and told the porter that he had brought a letter from the sacred tribunal for his master. The summons required the accused to appear at a certain hour at the appointed spot, within a fortnight after its delivery, to answer for his base and criminal conduct before the sacred tribunal, or otherwise clear himself of the accusation; at the same time threatening to proceed against him for contempt in case of non-appearance. If the accused attended the summons, the schœffe who brought the accusation was called upon by the freygraf to state all that he and his witnesses knew relating to the charge, after which the accused and his witnesses were heard. The judges were all armed and dressed in black gowns, with a cowl that covered their faces like a mask. When the sentence was pronounced, the execution of which, in case of capital punishment, was intrusted to all the members of the order, the condemned (who came under a kind of safe conduct) was dismissed, with the warning that his life was forfeited, and that no power on earth could withdraw him from the deserved punishment. Whenever three sheriffs (for that was the number necessary for an ordinary execution) afterwards met the person condemned, they seized him, and with one of the ropes which they carried in their sleeves, hung him on the next tree, fixing a dagger in the trunk to denote that the deceased was killed by the holy tribunal. When such an event occurred, no court of law dared to take notice of the affair; every man's tongue was struck silent, for fear of incurring the vengeance of this terrible body. This punishment however was seldom inflicted upon those who readily appeared; in such cases the judges were satisfied with causing the defender to redress the wrong that he had inflicted. But if the accused failed to attend the summons, which was repeated three times, judgment passed by default, and the accused was declared an outlaw. Every sheriff, though he were the father or son of the criminal, was duty-bound to put him to death by the rope, the dagger, the sword, or even poison, and to revenge any insult offered to the tribunal upon man, woman, or child, noble or plebeian, free-born or slave, house or farm, monastery or nunnery, that dared to shelter him.

The power of this tribunal was greater than that of the Holy Inquisition; it struck terror into all Germany, and especially in Westphalia, where it originated. Princes and nobles were anxious to enter into this order either for protection against their enemies, or to avoid the jurisdiction of a tribunal the power of which they were unable to withstand. Towards the end of the fifteenth century, the German empire having acquired more political consistency, and the objects for which this tribunal was instituted having ceased to exist, it gradually lost its power, without being abolished by any legislative enactment. Some traces of the revival of this tribunal appear in the seventeenth century, but its efforts to regain its former importance were checked by the public authorities. It sunk at length into utter in-

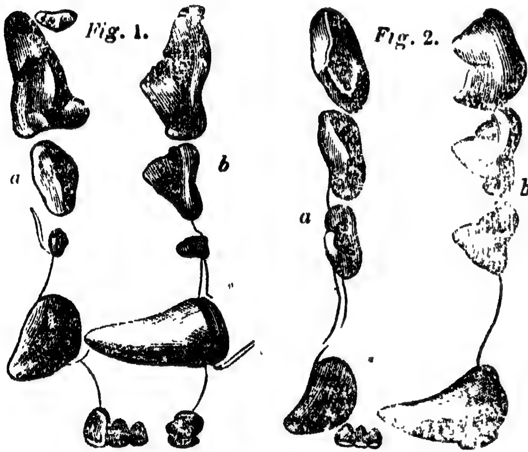
significance; and a remnant of it which continued to act as a kind of society for the suppression of vice was abolished in Westphalia by order of Jerome Buonaparte in the year 1811. The members of the order maintained that they were the true and genuine possessors of the secrets intrusted to the Fehm by Charlemagne, but no one would or could explain the signification of the mystical S. S. G. G. Goethe has given the most graphic picture of the working of this tribunal in his historical drama 'Goetz von Berlichingen.' The best historical account of its organization is by Paul Wigaud, 'Die Fehmgerichte Westphalens,' Hamm., 1827.

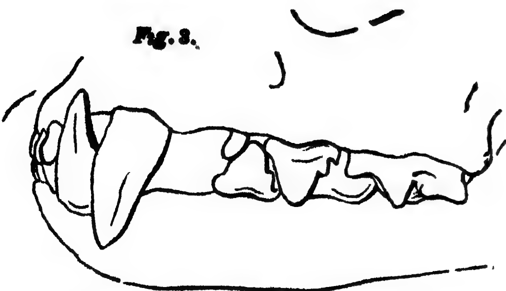
FELEGYHA'ZA, a market town, and the capital of the Hungarian district of Little Cumania, situated on the high road between Pesth and Temeswar, in the middle of a country of corn-fields, vineyards, and orchards; in 46° 43′ N. lat., and 19° 52′ E. long. It contains about 1370 houses, and a population of about 15,030. There is a Roman Catholic church, a gymnasium, and a very handsome building in which the Cumanian courts of justice are held and the public archives kept. Roman urns have been found in the vicinity of the town. The cattle-markets held here are considerable.

FELIPE, SAN, a town in South America, in the republic of Venezuela, and the department of Sulia, in 10° 30′ N. lat., and 68° 30′ W. long., in a pleasant valley on the small river Aroa. In the surrounding country, which is diversified by high hills and wide fertile valleys, great quantities of cocoa, coffee, maize, and rice are grown, also a little cotton. These commodities are sent to Puerto Cabello to be exported. The town, which has a population of about 7000 souls, has several handsome houses, and its streets are regularly laid out. Some copper-mines are worked in the neighbourhood.

FELIS, FE'LIDÆ, animals of the cat kind, a family of *Carnivora*, in which the organs of destruction reach their highest development. They are, among the quadrupeds, what the *Falconidæ* are among the *Birds*.

The principal instruments of the destructive energy of these animals are the teeth and claws.





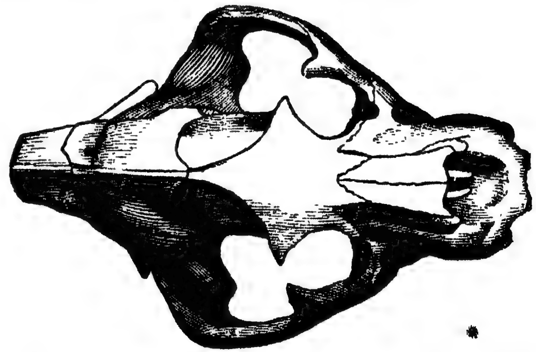
Teeth of the cat family. 1, Upper jaw; *a*, internal view; *b*, external view; 2, lower jaw; *a*, internal view; *b*, external view; 3, teeth when the jaws are shut seen in profile: from F. Cuvier.

The dental formula then in these animals is the following:—Incisors, $\frac{6}{6}$, canines, $\frac{1-1}{1-1}$, molars $\frac{4-4}{3-3} = 30$.

The formation of these teeth is beautifully shown in four preparations in the museum of the Royal College of Surgeons in London. No. 329 is the anterior part of the right *ramus* of the lower jaw of a young lion, exhibiting the teeth, together with the gums in which they are imbedded, and the border of soft parts, or lip, with which they are surrounded. No. 330 is the anterior part of the upper jaw of a young lion injected, in which the body of the second or permanent laniary (canine tooth, or *cuspidatus*) is pretty completely formed, and the fang forming. The laniary is cut down in the direction of its axis to expose the cavity containing the pulp on which it was forming. There is one of the molars in the act of being shed, and the adult or permanent tooth is pushing into the gum. No. 331 is the counterpart, or opposite section of the same laniary; and No. 332 is the laniary of the jaw of the opposite side of the same lion, showing the whole of the pulp on which it was forming. (*Catalogue, Physiological Series, Gallery*, vol. i. p. 95.)

The articulation of the condyles of the lower jaw in which this formidable apparatus is set is so contrived as to cause its operation in the most efficient manner. These processes are situated in the same straight horizontal line; they are cylindrical and firmly locked in the transversely elongated glenoïd cavities, the margins of which are so extended both before and behind the condyle that rotatory motion is impossible. The crowns of the molar or rather lacerating teeth are compressed and covered with enamel, as indeed are those of all the others: the molars terminate in pointed processes, and the lower teeth shut within the upper. Thus, when called into action, the teeth and jaws operate like the antagonist blades of a pair of scissors upon the substance submitted to their cutting edges. The canine teeth, the principal prehensile weapons of the head, are very long and large, especially in the larger cats. If we examine the cranium of a lion or tiger we shall be at no loss to discover the machinery by which this dental apparatus is worked.

The *crista occipitalis*, which is most strongly marked in the cats, is a sharp and prominent bony ridge rising from the upper and hind portion of the skull. Its chief use is for the attachment of the temporal muscle, and the size of the temporal fossa, and the strength and extent of the zygomatic arch depend upon the magnitude of that muscle. In no animals is this fossa larger than in the carnivora. It not only occupies the whole of the sides and upper part of the skull, but is still further increased by the prominent bony crests proceeding from the frontal, parietal, and occipital bones. The temporal muscles would indeed almost completely cover the cranium in many of these animals, were it not for their separation by the parietal ridge.

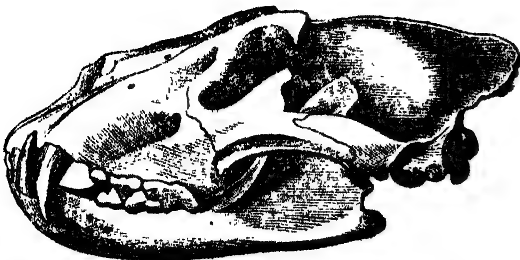


Skull of lion seen from above, showing the extent of the zygomatic arches and temporal fossæ.

The zygomatic suture is so oblique that the temporal bone forms the whole superior margin, and the *os malæ* the inferior edge of the zygoma.

In consequence of the construction which we have endeavoured to explain, the lower jaw is capable of motion only upwards and downwards, and entirely incapable of that motion in a horizontal direction which is necessary to mastication, properly so called. Accordingly the cats cut and lacerate their food coarsely, and transmit it in large portions to the stomach, there to be acted on by the gastric juice.

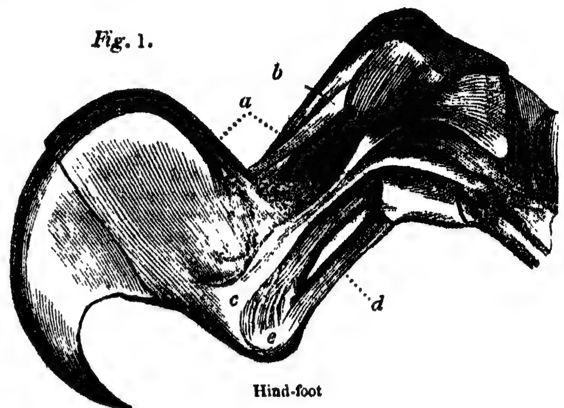
The muscles of the neck and fore-quarter of the cats are especially powerful to give full effect to this part of the organization, and to enable the animal to drag or carry away its prey.

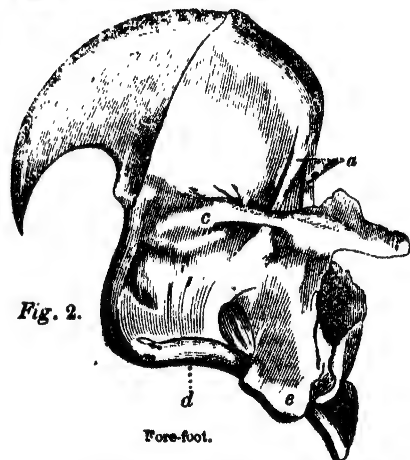


Skull of lion seen in profile, showing the prominent bony crests.

We must next turn our attention to the other organs of prehension, the claws.

The five toes of the anterior, and four toes of the posterior extremities of the cats are armed with very strong, hooked, sub-compressed sharp claws. These extremities, the anterior ones especially, thus become powerful instruments for seizing and rending the prey. The muscles that are to wield these weapons are of great strength: those of the fore arm especially, which in the lion and tiger offer the same arrangement for flexion, extension, pronation, and supination, as is observed in man, are highly developed, and the blow alone which the animal can deal with this limb is frequently fatal. It is asserted that the Bengal tiger has been known to fracture the skull of a man with one stroke of its heavy paw. The claws, by a beautiful conformation, are always preserved without effort from coming in contact with external bodies, so as to keep them sharp and ready for action. There are some interesting specimens in the Museum of the Royal College of Surgeons in London, which will illustrate this provision. No. 287 of the 'Physiological Series' is a toe from the right fore foot of a lion, with the last phalanx retracted on the ulnar (which from the prone state of the foot is the outer) side of the second phalanx. This state of retraction is constantly maintained, except when overcome by an extending force, by means of elastic ligaments, two of which have bristles placed beneath them in the preparation. The principal one arises from the outer side and distal extremity of the second phalanx, and is inserted into the superior angle of the last phalanx; a second arises from the outer side and proximal end of the second phalanx, and passes obliquely to be inserted at the inner side of the base of the last phalanx; a third, which arises from the inner side and proximal extremity of the second phalanx, is inserted at the same point as the preceding. The tendon of the flexor profundus perforans, which is the antagonist of the ligaments, has been divided. No. 287 A is a toe from the left fore foot of a young lioness, with the last phalanx drawn out, as in the action of the flexor profundus. The same ligaments are shown as in the preceding preparation, together with the insertion of the flexor and extensor tendons. In order to produce the full effect of drawing out the claw, a corresponding action of the extensor muscle is necessary to support and fix the second phalanx; by its ultimate insertion in the terminal phalanx, it serves also to restrain and regulate the actions of the flexor muscle. A bristle is placed beneath that part of the extensor tendon which passes under one of the elastic ligaments to be inserted into the base of the last phalanx immediately above the articulation. In both preparations lateral processes of tendon may be observed going to the under part of the base of the phalanx, which are partly inserted there, and partly lost in the integument: they are given off from the extensor tendon as it passes over the proximate phalanx, and are joined by ligamentous fibres from the sides of the same phalanx. No. 288 is a toe from the right hind foot of a lion, with the last phalanx drawn out, and the elastic ligaments put on the stretch. As the phalanges of the hind foot are retracted in a different direction to those of the fore foot, *i. e.* directly upon and not by the side of the second phalanx, the elastic ligaments are differently disposed, as may be seen by comparing this with the preceding preparation. The outer ligament is of a flattened triangular form; it arises from the whole outer side of the middle phalanx, is strongest at the anterior margin, and is inserted at the superior angle of the last phalanx: the inner ligament is of a rounded form, arises from the inner side and distal end of the second phalanx, and is also inserted at the superior angle of the last phalanx, which is necessarily drawn back in the diagonal of the elastic forces. No. 288 A is the innermost toe or pollex of the right fore foot of a young lioness, exhibiting a disposition of the elastic ligaments and mode of retraction similar to the toes of the hind foot; but here the inner ligament is of the flattened triangular form, and the outer one rounded. The latter passes between a division in the extensor tendon, one part of which is inserted in the base of the last phalanx just above the articulation; the other part into the outer side of the base of the phalanx, and into the integument. (*Catalogue, Physiological Series, Gallery*, vol. i., p. 75.) 'It seems scarcely necessary,' adds the able author of the foregoing description, 'to allude to the final intention of these beautiful structures, which are, with some slight modifications, common to the genus *Felis*. The claws being thus retracted within folds of the integument, are preserved constantly sharp, and ready for their destined functions, not being blunted and worn away in the ordinary progressive motions of the animal; while at the same time, as soft parts only are brought in contact with the ground, this circumstance contributes to the noiseless tread of the feline tribe.' (*Ibid.*)





Structure of the apparatus for retracting and extending the claws of the cats, as exemplified in the fore foot and hind foot of the lion.

The elastic ligaments which retain the last phalanx and claw in a state of retraction are not the same in the fore and hind foot.

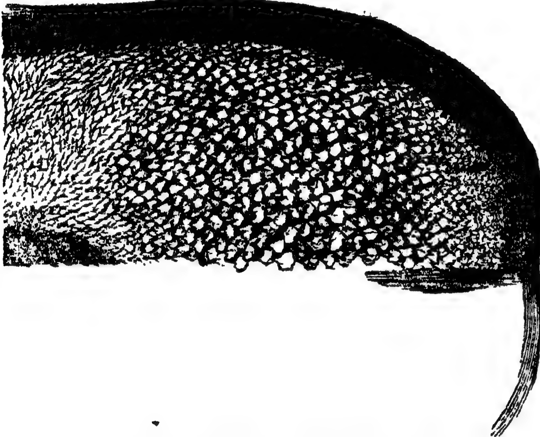
In figure 1, which is a toe from the left fore foot of a young lion, represented in a state of extension, *a* points to the two elastic ligaments; *b*, the tendon of the extensor muscle; *c*, a process of inelastic tendon; *d*, the tendon of the flexor muscle, which passes over the upper extremity of the last phalanx at *e*, as over a pulley, and thus assists the powerful action of that muscle.

In figure 2, a toe from the hind foot, the two elastic ligaments (*a*) converge to be inserted into the upper angle of the last phalanx, and draw it backwards directly upon, instead of by the side, of the penultimate phalanx: *c* is a process of lateral inelastic tendon; and *d* the tendon of the flexor profundus, which is strongly strapped down by an annular ligament, *e*.

The claw is supported on the last phalanx, which is of a very peculiar form. Its two portions are united to

each other at nearly right angles. The base of the claw is received into a groove in the body of the bone, to prevent its being pushed backwards in the violent action of the paws. The two parts of the bone form a species of hook or crotchet. The superior end of the phalanx in this state of repose is placed almost vertically; while the other extremity lies nearly parallel to the second. The articulation is at the upper end of the vertical portion, and the flexor tendons, passing over the upper part of the bone, are strongly fixed to the other portion. The action of the flexor profundus causes the whole bone to move through 90° round the end of the second phalanx. (Dr. Traill.)

Having laid before the reader the mechanism of the parts more immediately concerned in the capture of the prey and the separation of its flesh, we must notice another organ which in the cats is used for other purposes than those of mere taste and deglutition. The roughness of a domestic cat's tongue is familiar to every one, as well as the action of lions and tigers in licking the bones of their prey in order to detach any remnants of flesh that may be adhering thereto. This is effected by numerous horny papillæ, which are differently arranged in different species, some having them in straight rows, others in alternate lines; but in all the points are directed backwards. In the Museum of the Royal College of Surgeons are preparations well illustrating the structure of the tongue in these animals. No. 1509



Portion of Lion's Tongue, showing the horny papillæ. From the specimen in the College of Surgeons.

exhibits the tongue and larynx of a young lion injected. The tongue is of considerable length, in consequence of the distance at which the larynx and os hyoïdes are placed behind the bony palate. The soft palate is of a proportional extent. All that part of the tongue which corresponds to the soft palate is smooth; as it advances forwards it is covered with large soft papillæ directed backwards; then there are four large fossulate papillæ, anterior to which the simple conical papillæ continue increasing in size to near the tip of the tongue: the strong cuticular spines with which they are armed have been removed, showing the vascular secreting surface beneath. With the larynx there are preserved the thyroid glands and part of the wide trachea. No. 1510 is a portion of the cuticular covering of the smaller posterior conical papillæ, from the preceding tongue. No. 1511 shows a portion of the cuticular covering of the anterior papillæ of the same tongue. At the fore part of the base of each of the larger spines may be observed a group of small gustatory papillæ. No. 1512 is the extremity of the tongue of a lion, with the cuticular covering of the papillæ removed from one side; and No. 1513 is the anterior part of the tongue of a lion, with the cuticular and spiny covering of the papillæ preserved. (*Catalogue, Physiological Series, Gallery*, vol. iii. part i. p. 12.)

Mr. Owen remarks, that in the cats generally the connexion of the *os hyoïdes* to the cranium is not by a long elastic ligament, as in the lion, but by an uninterrupted series of bones, and that this latter structure exists in the *Cheetah* (*Felis jubata*). (*Zool. Proc.* 1833.)

This leads us to the other

Digestive organs.—In the cats the salivary glands are small, as might be expected where it can hardly be said that mastication is exercised. The stomach of the lion is divided, by a slight contraction in its middle, into two portions. Its coats, particularly the muscular coat, are very strong, as in most of the *Carnivora*. Blumenbach observes, that in most carnivorous quadrupeds, particularly those of a rapacious nature, the stomach bears a considerable resemblance on the whole to that of the human subject. Mr. Lawrence, in his notes, remarks, that the food of carnivorous animals, approaching in its constituent elements more nearly to those of the animal than that of the herbivorous tribes, is more easily reduced into the state which is required for the nourishment of the body in the former than in the latter case. In the Carnivora, the stomach, which is of a cylindrical form, has no cul-de-sacs; the œsophagus opens at its anterior extremity, and the intestine commences from the posterior, so that every thing favours a quick passage of the food, which receives no mastication, and is retained a very short time in the stomach. The intestine has no valves, is small in diameter, but muscular, and the whole canal, when compared with the body, is extremely short, being as 3 or 5 to 1. It is worth noticing, that in the domestic cat they are as 5 to 1, but in the wild cat they are only as 3 to 1. Some of the Carnivora have no cæcum, and in those that have this appendage it is constantly small and uniform in its cavity. In the Museum of the College of Surgeons are four preparations, Numbers 693 to 696 (*Gallery*), both inclusive, showing the structure of the intestines of a lion. No. 724 shows the termination of the ileum of a lion, with the cæcum or caput coli injected. The cæcum is simple, resembling that of the Suricate (*Ryzæna tetradactyla* of Illiger), with its apex similarly occupied by a cluster of glands; the terminal orifice of the ileum is also of a circular form, but it is situated on a valvular prominence in the large intestine. No. 730 is the injected colon of a lion. The longitudinal muscular fibres are very strong, and are disposed around the whole circumference of the intestine, which consequently is not drawn up into sacculi. The lining membrane is smooth, and is thrown into zig-zag rugæ. No. 736 is a portion of the rectum of a lioness, showing the strong round fasciculi of longitudinal fibres forming the outer stratum of the muscular coat, part of which has been turned down to show the inner circular fibres. The intestinal glands of the ileum in the lion are shown by No. 757. No. 806 shows the liver of the domestic cat, and its subdivision, as in all carnivorous quadrupeds, into a great number of lobes. The second lobe from the left side, or cystic lobe, is deeply cleft for the insertion of the suspensory ligament; to the right of this cleft it is perforated for the lodgement of the gall-bladder. No. 807 is the cystic lobe of the same species, showing that the gall-bladder is situated in the middle of the substance of the large lobe. (*Catalogue, Gallery, Phys Series*, vol. i.) Blumenbach remarks that the ductus choledochus forms a pouch between the coats of the intestine for receiving the pancreatic duct in the cat. No. 821 in the Museum of the College of Surgeons displays a portion of the duodenum, with the termination of the hepatic and pancreatic ducts of a lion. A black bristle is passed into the ductus communis choledochus, and a white one into the pancreatic duct; the mucus coat of the intestine is laid open to show their junction. The orifice of a distinct pancreatic duct is preserved. No. 837 is the spleen, with a portion of the duodenum and pancreas of a domestic cat. The spleen is of an elongated trihedral form, attached to the stomach by a duplicature of peritoneum inclosing its vessels: this duplicature passes off from the angle formed by the two lesser sides. The splenic vein is seen passing from the spleen along the pancreas, which extends from it to the duodenum. No. 840 exhibits the stomach and duodenum, spleen, pancreas, and great omentum of a small carnivorous animal, apparently of a cat. The parts have been injected, and show remarkably well the principal peculiarities in the form and disposition of these parts as they exist in the feline tribe. A part of the œsophagus has been inverted, to show the transverse rugæ of its lining membrane, near its termination. The stomach exhibits the broad dilated cardiac and the narrow tubular pyloric divisions, which are acutely bent upon each other: in the duodenum may be observed its regular extended curve, and its broad mesentery, by which much greater freedom of motion is allowed to this portion of the intestinal canal than in the human subject. The small omentum is seen attached, not in a regular line along the lesser arch of the stomach, but advancing in an irregular scolloped manner upon its anterior surface: an analogous process of peritoneum is attached

posterior to the lesser curvature The great omentum anteriorly is continued from the greater arch of the stomach, from the left end of which it is continued down the spleen, and posteriorly along the pancreas, which is thus seen to have an entire investment of peritoneum: from the pancreas it extends to the pylorus, where it becomes continuous with the anterior layer, completing the circle, and leaving a large aperture behind the lesser arch of the stomach, which leads into the omental cavity analogous to the foramen Winslowi. The form of the pancreas and its division into the transverse or greater lobe and the circular or duodenal lobe are well shown, and also the form and situation of the spleen. (*Catalogue, Gall., Phys. Series*, vol. i.)

Organ of the Voice.—The terrific roar with which the larger animals of this family rush on their prey is well known, and well calculated to paralyze the nervous system of the victim with fear. Stealing on the victim with noiseless tread till couched within the proper distance for their spring, these destroyers leap on it with a horrid sound which salutes its ear in the same moment almost that it feels the blow of the deadly talons and the murderous gripe of the teeth. The cartilages of the larynx of a lion, the large size of the vocal organ, and the rounded contour of the epiglottis, may be seen in preparation No. 1172 (*Gallery*) of the Museum of the Royal College of Surgeons. From the narrowness of the thyroïd cartilage anteriorly, there is a considerable interval at that part between the thyroïd and cricoïd cartilages, a structure which, as the Catalogue tells us, obtains in all the feline animals. No. 1129 consists of the heart and lungs of a kitten, and shows principally the subdivision of the lungs into many lobes, and more especially the small azygos lobe of the right lung, filling up the space which intervenes between the heart and diaphragm in this and most other quadrupeds. Vicq-D'Azyr and Blumenbach notice the two delicate membranes lying under the ligamenta glottidis of the cat, which probably cause the purring noise peculiar to it.

Urinary and Genital Organs.—'The structure of the kidney in *Mammalia*,' observes Mr. Lawrence, in his notes to Blumenbach's 'Comparative Anatomy,' 'displays two very opposite varieties, which may be called the *simple* and the *conglomerated* kidneys. In the former there is a single papilla, which is surrounded by an exterior crust of the cortical substance. This is the case in all the *feræ*, and in some other animals, as many *rodentia*.' 'In some animals,' says John Hunter, 'the kidney is a very oblong body, extending in length for a considerable way, and very narrow, as in some fish, while in other animals it is almost globular, as in the leopard. * * * In the lion kind, cat kind, as also in the hyæna, we find that perhaps one-half of the veins get on the external surface, and are either strongly attached to or pass in a doubling of the capsule of the kidney, and then pass along like the veins of the pia mater, afterwards joining the trunks from the inside just as they pass out. * * * The veins of the kidneys have in general nothing particular respecting them. They in common attend the arteries, or at least ramify similarly to the arteries, excepting in the lion and cat kind, as also in the hyæna, where some of the veins ramify on the surface, while the others are attending the arteries.' The reader will find in the Museum of the College of Surgeons some beautiful preparations illustrative of the kidneys, &c., of the *Felidæ:* they are numbered 1200 to 1205 both inclusive, 1218 to 1221 both inclusive, and 1284 (*Gallery*).

Blumenbach observes that in some species of the cat kind the glans is covered with retroverted papillæ, which, as these animals have no vesiculæ seminales, may enable the male to hold the female longer in his embraces. Most of the cats are retromingent, but not, as has been so often and erroneously repeated from the time of Aristotle, retrocopulant.

Brain, Nervous System, and Senses.—Blumenbach observes that the bony tentorium cerebelli constitutes in most species of the cat kind an uniform bony partition which leaves a quadrangular opening in the lower part of the cranium. In the cat the brain forms $\frac{1}{82}$ of the body, the proportion of the weight of the cerebellum to the cerebrum is as 1 to 6, and the breadth of the medulla oblongata after the pons varolii is to that of the brain as 8 to 22. In the Museum of the Royal College of Surgeons, No. 1321, (*Gallery*) is the brain of a tiger. The pia mater has been removed from the medulla oblongata, showing the transverse tract of medullary matter posterior to the tuber annulare, called *corpus trapezoideum;* this is traversed by the corpora pyramidalia. The development of the cerebrum is such as not only to cover the optic lobes or bigeminal bodies, but also the anterior half of the cerebellum itself; and the surface of the cerebrum is augmented by convolutions, of which one is analogous to the single convolution in the agouti, and extends parallel with the fissure dividing the hemispheres; a second runs parallel with and external to the preceding; a transverse one proceeding from the mesial fissure marks off what may be regarded as the anterior lobes, which, together with the lateral regions of the hemispheres, are traversed by other anfractuosities. No. 1325 is the brain of a lion, closely resembling the preceding in general form and disposition of the convolutions. No. 1326 is the brain and part of the spinal chord of a young lion, with the vessels of the pia mater minutely injected. The left lateral ventricle is exposed, showing the pes hippocampi and the choroid plexus. The fourth ventricle is also laid open, and contains a similar plexus of minute arteries. Bristles are inserted into the hollow olfactory and the optic nerves, and black threads are tied round the origins of the remaining cerebral nerves of the right side. A small quill is placed in the infundibulum; but the pituitary gland, which may be seen in both the preceding specimens is here removed. The union of the vertebral arteries to form the basilar artery, the great length of that vessel, and its division to join with the internal carotids in the formation of the circle of Willis, are well displayed. No. 1326 is a portion of the basis of the brain of a lion, prepared to show the form and relative proportions of the bigeminal bodies or optic tubercles; of these, the posterior, though smaller in longitudinal diameter, are broader, and rise above the level of the anterior pair. No. 1372 and No. 1373 are two highly interesting preparations of the spinal chord and cauda equina of the lion. (*Catalogue*, vol iii.)

Taste and *Touch.*—For illustrations of the former sense we refer the reader to the descriptions of the preparations, Nos. 1509 to 1513, both inclusive, above given. The latter sense presents nothing particularly worthy of notice in the cats; the whiskers indeed are provided with very large nerves, and may be serviceable in warning the animal in certain situations where they come in contact with any object.

Smell.—Blumenbach enumerates the cat kind among the animals remarkable for their acuteness in the sense of smelling, and as affording examples of a very complicated formation of the ethmoïd bone, both in regard to the elegant structure of its cribriform lamella, and to the wonderful convolutions of its turbinated portions, which procure as large a surface as possible within the confined space of the nasal cavity, for the application of the Schneiderian membrane. The *conchæ narium inferiores* are also much convoluted. There is in the Museum of the College of Surgeons (*Gallery*) a preparation (No. 1552) of a longitudinal vertical section of the head of a leopard, showing the turbinated bones of the left side *in situ;* and another, No. 1553, of a longitudinal section of the side of the head of a young lion, showing the ossa turbinata *in situ* also. The following luminous description of the latter is given in the Catalogue. (*Physiological Series*, vol. iii.) The superior bone is of a conical form, extending along the whole of the roof of the nasal cavity, with its base opposite to the frontal sinus (which is here exposed), and its apex terminating above the anterior extremity of the inferior turbinated bone. It presents a smooth or uniform surface towards the nasal cavity, as may be seen in the preceding specimen; but the lamella forming this surface has been partially removed, showing the subjacent lamella, which is folded longitudinally: the more complicated disposition of the exterior lamella of the same bone is exhibited on the opposite side of the preparation, where the surface for the extension of the olfactory membrane is augmented by a series of deep arched folds, having their convexity upwards. The middle turbinated bone is also of a pyramidal form, its broad basis being applied to the cribriform plate of the ethmoïd bone, and its apex extending between those of the other two turbinated bones, but not reaching so far forwards. The nasal or mesial surface of this bone is complicated by numerous deep furrows, two of which extend longitudinally, parallel with the superior margin of the bone, while the others radiate in an irregular manner from the lower point of attachment. The lateral surface of the bone is less

complicated and extensive. The inferior and anterior turbinated bone is of an elongated form, and contracted at both extremities. Its posterior and inferior extremity is attached to the outer parietes of the nasal passage, below the middle of the turbinated bone: from this point it extends obliquely upwards, enlarging as it crosses the anterior extremity of the middle bone, and then diminishing in size to its anterior and superior attachment behind the external nostril: from its position therefore the odorous particles in inspiration must first impinge upon this bone. Its nasal surface is pretty uniform, presenting only one curved groove, parallel with and near to the lower margin of the bone, in this respect differing widely from the lower turbinated bone in the hare: its exterior surface is similarly characterized. In the preparation the outer lamella has been cut away to show the subjacent fold. The whole being minutely injected, the vascularity of the pituitary membrane extended over this vast and complicated surface is well displayed. The pituitary membrane is evidently thickest and most vascular at the anterior part of the cavity, where it must receive the first impression of the external air. A portion of the pituitary membrane is reflected from the base of the middle turbinated bone, showing the fibres of the olfactory nerves spreading over it. In No. 1554 (the opposite section of the same head) and No. 1555 (the intermediate section) this part of the organization is still further illustrated.

Hearing.—This sense is acute in most of the cats. There is, in the greater number of mammiferous quadrupeds, connected with the tympanum another cavity which Blumenbach compares, with regard to the situation of the bony organ that contains it, to the mastoïd cells in the temporal bone of man. In several animals (and the cat is one of them) this organ is a mere bony cavity. The *ossicula auditûs*, considering the *lenticulus* as only a process of the *incus*, are three, as in the human subject. In the Museum of the College of Surgeons there is a preparation (No. 1600, *Gallery*) of a section of the cranium of a young lion, including the organ of hearing of the left side. A part of the meatus is preserved with the membrana tympani, and the cavity of the tympanum is laid open, showing the convexity of the membrane turned towards it, as in most mammalia. (*Catalogue*, vol. iii.)

Sight.—This sense is acute in the *Felidæ*, and they have the nictitating membrane very large and moveable. The pigment, as far as is known, is, generally speaking, of two colours, and the anterior perforation of the iris is formed of two segments of large circles joined, giving it a long and a short axis, the long axis being vertical. In the Museum of the College of Surgeons (No. 1710, *Gallery*) is the eye of a lion minutely injected by the ciliary arteries, and the sclerotic coat transversely divided, and reflected from the choroid, to show the vascularity of that tunic. No. 1730 is a preparation of the eye of a lion, showing the broad patch of tapetum lucidum below and also a little above the insertion of the optic nerve. The succeeding numbers to No. 1733 inclusive are also illustrative of this part of the organization in the lion and the leopard. John Hunter, *Observations on certain parts of the Animal Œconomy*, 2nd. edit., p. 243) remarks, that when the pigmentum is of more than one colour in the same eye, the lighter portion is always placed at the bottom of the eye, in the shape of a half-moon with the circular arch upwards; the straight line or diameter passing almost horizontally across the lower edge of the optic nerve, so that the end of the nerve is within this lighter-coloured part, which makes a kind of semicircular sweep above it: and he observes that the shape is peculiar to the cat, lion, dog, and most of the carnivorous tribe. Mr. Owen observes that the *Cheetah* has the circular pupil of the *Lion, Tiger, Leopard*, and *Jaguar*. (*Zool. Proc.*, 1833.)

Natural History.

The osteology of the Felidæ presents little for the distinction of species, except size, and in no animals does specific character depend upon size and colour more entirely than it does in this family. There are indeed differences: such, for instance, as that pointed out by Mr. Owen between the skull of the lion and that of the tiger; but, taken as a whole, the skeleton of a cat is very nearly the miniature representation of that of a lion or a tiger. We accordingly find that the disposition of many leading zoologists has been to bring all the numerous species under one genus. Linnæus arranges them under *Felis*, the third genus of his order *Feræ*, placing them between the dogs (*Canis*) and *Viverra*. Illiger assigns to them a position in his order *Falculata*, with the title *Sanguinaria*. Cuvier places them under the name of *Les Chats* (*Felis*, Linn.) among his *Carnivores*, the third family of his *Carnassiers*, between the *Hyænas* and the *Seals*. Temminck regards the genus *Felis* as an indivisible group zoologically, but separates them into two sections, the first comprising those which are found in the Old Continent and its Archipelagos, eighteen species in number; the second those which occur in the New World, of which he enumerates nine species. C. L. Bonaparte, prince of Musignano, admits into his family *Felina* the genera *Proteles*, *Hyæna*, and *Prionodon*, a very questionable admission. Dr. Leach gives the *Lions* a generic distinction with the name *Leo*. The *Lynxes* are separated as a genus by Mr. Gray, under the title of *Lynchus*; and the *Hunting Leopard*, *Felis jubata*, is characterized, generically by Wagler as *Cynailurus*. The whole family may be popularly divided into Lions, Tigers, Leopards, Lynxes, and *Wild Cats*, or *Cats* properly so called, the two latter terms being more particularly applicable to the smaller forms. Under the first four titles will be found in this work the notices of those subdivisions, and we shall in the present article treat specially of the latter subdivision only.

Geographical Distribution of the Felidæ.—The form is widely spread over the face of the earth; but reaches its most powerful development in the warmer climates. With the exception, however, of New Holland and the islands of the Southern Pacific, species are found in every part of the world, excepting the arctic regions; and some extend far beyond the limits of moderate temperature and even into districts where the severity of the cold is almost arctic. No species has yet been discovered common to the Old and New World.

Cats.

Among the smaller species of the great feline family our attention is naturally first directed towards that domestic animal which is found in almost every house. 'In this case,' says the author of that interesting little book *The Menageries* (Lond. 12mo. 1830), 'unlike that of the dog, there is no doubt which is the original head of the domesticated stock. The wild cat of the European forests is the tame cat of the European houses; the tame cat would become wild if turned into the woods; the wild cat at some period has been domesticated, and its species has been established in almost every family of the Old and New Continent.' There is good authority for this assertion; but the origin of the domestic cat has been attributed to a very different source, and there are not wanting zoologists who even now hold that the parent stock of that useful animal is still undiscovered.

Rüppell during his first travels in Nubia discovered a cat (*Kleinpfötige Katze*, *Felis maniculata*) of the size of a middle-sized domestic cat, and one-third smaller than the European wild cat (*Felis Catus ferus*, Linn.). All the proportions of the limbs were on a smaller scale, with the exception of the tail, which is longer in *Felis maniculata*. The woolly or ground hair is in general of a dirty ochreous, darker on the back and posterior parts, and becoming gradually lighter on the anterior and lateral parts; longer hair of a swarthy dirty white, so that the appearance of the animal is greyish-yellow. Skin of the edges of the lips and of the nose bare and black. Beard and bristles of the eyebrows shining white, brown at the roots; edges of eyelids black; iris glaring yellow. From the inner corner near the eye there is a dark-brown streak running in the direction of the nose, and there is a white streak as far up as the arch of the eyebrows; between these two streaks is another greyish one extending on the forehead by the side of the ears and under the eyes. Outside of the ears grey, inside white and without tufts of hair. Eight slender black undulating lines arise on the forehead, run along the occiput, and are lost in the upper part of the neck. Cheeks, throat, and anterior part of the neck shining white. Two ochreous-yellow lines spring, the one from the outer corner of the eye, the other from the middle of the cheek, and meet both together under the ear; and two rings of the same colour encircle the white neck: below the rings there are spots of ochreous yellow. Chest and belly dirty white with similar spots or semicircular lines. A dark streak along the back becomes lighter as it rises over the shoulders, and darker on

the cross. This streak is gradually lost on the upper part of the tail, the lower surface of which is white-yellow. The tail is almost of an equal thickness, rather slender, and with two dark rings at its point. The extremities, which have less hair in proportion on the outer side, are of the general colour, with besides five or six blackish semicircular bands on the fore-legs, and six distinct dark cross streaks on the hind-legs. The inner sides are lighter in colour, with two black spots or streaks on the upper parts of the fore-legs, and the hind extremities show the cross streaks winding around the thighs towards the inside. Foot, soles, hind parts of ankles, and wrists shining black. Length two feet five inches, the tail being about nine: height at the shoulder about 9½ inches. The description was taken from an aged female. M. Rüppell, who found this cat west of the Nile, near Ambukol, in rocky and bushy regions, is of opinion that there can be no doubt that it is descended from the domestic cat of the antient Egyptians, now to be traced in the cat-mummies and their representations on the monuments of Thebes. In the 'Description de l'Egypte, Hypogées de Thebes,' vol. ii. pl. 45, No. 14, is the representation of a cat. Pl. 51, No. 3, shows a cat's mummy, and pl. 54, No. 7, the skeleton of a cat's mummy which in size of body, form of head, and length of tail accords perfectly with *Felis maniculata*. The question then arises whether this domestic cat might not have been transferred or bequeathed to the contemporary civilized Europeans by the Egyptians; and the superintendents of the Frankfort collection agree that the general facts strongly favour the opinion that *Felis maniculata* is the type of our domestic cat. M. Temminck concurs in opinion with M. Rüppell that this Nubian species is the stock from which it sprung. Sir William Jardine, in his able *Natural History of the Felinæ* (*Naturalist's Library, Mammalia*, vol. ii., small 8vo., Edinburgh and London, 1834), states that the opinion generally accepted before this by most naturalists was, that the wild cat of Europe was the original stock: but, he adds, that although, since the introduction of our house cat to this country, there may have been an accidental cross with the wild native species, an attentive examination of the greater numbers will at once show a very different form from that exhibited by the wild cat; the most prominent distinctions being the shortness of the legs and shortness and thickness of the tail in the latter. 'The domestic cat,' continues this author, 'is the only one of this race which has been generally used in the economy of man. Some of the other small species have shown that they might be applied to similar purposes; and we have seen that the general disposition of this family will not prevent their training. Much pains would have been necessary to effect this, and none of the European nations were likely to have attempted it. The scarcity of cats in Europe, in its earlier ages, is also well known, and in the tenth and eleventh centuries a good mouser brought a high price. Although, however, our opinion coincides with that of the above-mentioned authorities, and we think that we are indebted to the superstition of the antient Egyptians for having domesticated the species described by Rüppell, we have no doubt that since its introduction to this country, and more particularly to the north of Scotland, there has been occasional crossing with our own native species, and that the results of these crosses have been kept in our houses. We have seen many cats very closely resembling the wild cat, and one or two that were very tame, which could scarcely be distinguished from it. There is perhaps no animal that so soon loses its cultivation, and returns apparently to a state completely wild. A trifling neglect of proper feeding or attention will often cause them to depend upon their own resources; and the tasting of some wild and living food, will tempt them to seek it again, and to leave their civilized home. They then prowl about in the same manner as their congeners, crouching among cover, and carefully concealing themselves from all publicity. They breed in the woods or thickets, and support themselves upon birds or young animals. Few extensive rabbit warrens want two or three depredators of this kind, where they commit great havoc, particularly among the young in summer. They sleep and repose in the holes, and are often taken in the snares set for their prey. I once came upon a cat which had thus left her home: she had newly kittened in the ridge of an uncut corn-field. Upon approaching she showed every disposition to defend her progeny, and beside her lay dead two half-grown leverets.'

Before we quit this part of the subject we must not forget that among the animals seen by Rüppell in Kordofan he discovered a new small species of cat.

Mr. Bell (*History of British Quadrupeds*, Lond. 8vo. 1827) first addresses himself to the question whether the common wild cat is the original from which all our domestic cats have sprung, according to the general opinion of the older naturalists. He states that there are many reasons for believing that this opinion is entirely erroneous. In the first place, he observes, the general conformation of the two animals is considerably different, especially in the length and form of the tail, which in the wild cat is strong, robust, and at least as large towards the extremity, as at the base and middle, whilst that of the domestic cat tapers towards the apex. The fur too of the former, he remarks, is thicker and longer; and although the colours are somewhat like those which occur in some individuals of the ordinary species, there are, even in this respect, distinctions which can scarcely be considered otherwise than as essentially specific; as, for instance, the termination of the tail in a black tuft, which invariably marks the wild cat. To these distinctions may be added the difference of length of the intestinal canal; though domestication might account for much of that.

But to return to Mr. Bell. With regard to the alleged crossing between the wild and the domestic breeds, 'it is not without much reflection on the matter that he has come to the conclusion that this opinion of their intermixture, repeated and transmitted from one to another till it has become an uncontested dogma, is erroneous, and has its foundation in mistaken facts.' Mr. Bell then notices Rüppell's *Felis maniculata* above described, and comes to the conclusion that 'this species, to which the high authority of Rüppell has assigned the origin of our house cat, is still farther removed from it in essential zoological characters than even the British wild cat, to which it had been previously so generally referred; and that, as in the case of so many of our domesticated animals, we have yet to seek for the true original of this useful, gentle, and elegant animal.'

We must confess that we do not see much difficulty in coinciding with the opinion of Rüppell, Temminck, and Sir William Jardine upon the evidence at present known. It is not attempted to be denied that the Egyptians had a domestic cat, and we think there can be little doubt that the domestic cat of the Egyptians was identical with *Felis maniculata*. This extraordinary people, whose existence is now only to be traced in their wonderful and enduring monuments, were, when in their high and palmy state, the centre of civilization, and we can see no reason why other nations, who borrowed so largely from them, should not have also received their domestic cat among other benefits of civilization. This animal, when introduced, would be liable to all the usual consequences of domestication and of intermixture, according to the localities of the various nations who obtained it. We can see no reason why the domestic cat, from whatever source derived, should not breed with the wild cat in Great Britain, and we believe that it has so bred



Egyptian Cat. *Felis maniculata*.

The arguments derived from the difference between the tails of the wild cat, of the domestic cat, and of *Felis maniculata*, do not seem to us to carry much weight. We cannot shut our eyes to the effect of domestication on this organ among the dogs, which gives us every variety, from the well-clothed tail of the Newfoundland dog, setter, and spaniel, to that of the greyhound, which is so scantily furnished as to owe one of its excellencies to being 'tailed like a rat;' nay, in some varieties, that long tail is reduced to almost no tail at all. There are also tail-less cats, as Mr. Bell himself notices.

Still the doubt thrown on the question by a zoologist of so much experience and skill as Mr. Bell is deserving of the most serious consideration, and should stimulate those who have the opportunity to investigate the subject upon every occasion offered to them.

The domestic cat is *Le Chat* of the French, *Gatto* of the Italians, *Gato* of the Spanish and Portuguese, *Katze* of the Germans, *Cyperse Kat* and *Huyskat* of the Dutch, *Katta* of the Swedes, *Kat* of the Danes, *Cath* and *Gwr Cath** of the antient British, and *Felis domestica, seu Catus*, of Ray. The varieties, as in all cases of domestication, are endless: among the most noted are the Tabby, the Tortoiseshell, the Chartreux, which is bluish, and the Angora cat with its long silky hair. The domestic cat is but too famous for its attainments in the art of ingeniously tormenting, and it is difficult to say what end is answered by the prolonged agonies of fear and torture which the poor mouse is made to undergo before it receives the *coup de grace*. This refined cruelty appears to be confined to mice, young rats, and small quadrupeds: if a cat strikes down a bird, she does not trifle with it, but, conscious of its chances of escape, bites off its head or wounds it mortally at once.

We insert the following from Pennant, though it has been often quoted, not only as illustrating the manners of a period so distant as that of *Howel*, who died in the year 948, after a reign of 33 years over South Wales and of eight years over all Wales, but also on account of the reflection at the end, which we think worthy the consideration of those who are interested in inquiring whence the stock of the domestic cat was derived. 'Our ancestors,' says Pennant, 'seem to have had a high sense of the utility of this animal. That excellent prince, *Howel Dda* or *Howel the Good*, did not think it beneath him, among his laws relating to the prices, &c. of animals (*Leges Walliæ*, p. 247, 248), to include that of the cat, and to describe the qualities it ought to have. The price of a kitling before it could see was to be a penny; till it caught a mouse, twopence. It was required besides that it should be perfect in its senses of hearing and seeing, be a good mouser, have the claws whole, and be a good nurse; but if it failed in any of these qualities, the seller was to forfeit to the buyer the third part of its value. If any one stole or killed the cat that guarded the prince's granary, he was to forfeit a milch ewe, its fleece, and lamb; or as much wheat as when poured on the cat suspended by its tail (the head touching the floor) would form a heap high enough to cover the tip of the former. This last quotation is not only curious, as being an evidence of the simplicity of antient manners, but it almost proves to a demonstration that cats are not *aborigines* of these islands, or known to the earliest inhabitants. The large prices set on them (if we consider the high value of specie at that time) and the great care taken of the improvement and breed of an animal that multiplies so fast, are almost certain proofs of their being little known at that period.' (*British Zoology*.)

The *Wild Cat* is *Le Chat sauvage* of the French, *Gato montis* of the Spaniards, *Wilde Katze* and *Baumritter* of the Germans, *Vild Kat* of the Danes, *Cath goed* of the antient British, *Catus sylvestris* of Klein, *Felis Catus* of Linnæus, and *Felis sylvatica* of Merrett.

Description.—Head triangular, strongly marked; ears rather large, long, triangular, and pointed. Body strong, rather more robust than that of the domestic cat. Tail of equal size throughout its length, or rather larger towards the extremity. Fur soft, long, and thick; colour of the face yellowish gray, with a band of black spots towards the muzzle; whiskers yellowish white; forehead brown;

* It is worthy of remark that all these names are the same as the Latin *catus*, whence the diminutives *catulus* and *catellus*; and this is somewhat in favor of all northern and western Europe having received the cat through Roman civilization. We are thus brought nearer to Egypt, its probable origin. The Greek word *ailúros* (αἴλουρος) is an odd one, and helps us nothing, being apparently a descriptive term.



Wild Cat. Felis Catus.

head gray, marked with two black stripes passing from the eyes over and behind the ears; back, sides, and limbs grey, darker on the back, paler on the sides; with a blackish longitudinal stripe along the middle of the back, and numerous paler curved ones on the sides, which are darker towards the back, and become obsolete towards the belly, which is nearly white. Tail annulated with light grey and black; tip of the latter colour. Feet and insides of the leg yellowish grey; soles black, at least in the male, of which sex Temminck declares it to be a peculiarity. Colours of the female paler, and markings less distinct. Dimensions differing greatly according to the statement of various naturalists. Medium size of full-grown male:—

	Foot.	In.	Lines.
Length of head and body . . .	1	10	0
„ of head	0	3	8
„ of ears	0	2	3
„ of tail	0	11	2

Female rather smaller. (Bell.)

Temminck gives the average length as three feet.

Locality.—All the wooded countries of Europe, Germany especially; Russia, Hungary, the north of Asia, and Nepâl. The animal is larger in cold climates, and its fur is there held in higher estimation.

In Britain it was formerly plentiful, and was a beast of chace, as we learn from Richard the Second's charter to the abbot of Peterborough, giving him permission to hunt the hare, fox, and wild cat. The fur in those days does not seem to have been thought of much value, for it is ordained in Archbishop Corboyl's canons, A.D. 1127, that no abbess or nun should use more costly apparel than such as is made of lambs' or cats' skins.

The wild cat is now rarely found in the south of England, and even in Cumberland and Westmoreland its numbers are very much reduced. In the north of Scotland and in Ireland it is still abundant.

Among the foreign wild cats may be enumerated *Felis Chaus*, Guld.; the *Mota Rahn Manjur* or *Larger Wild Cat* of the Mahrattas (a lynx); and *Felis torquatus*, F. Cuv.; the *Lhan Rahn Manjur* or *Lesser Wild Cat* of the Mahrattas; *Felis Moormensis*, the *Moormi Cat*, Hodgson, from the Moormi Hills in Nepâl (*Zool. Proc.*, January, 1824). *Felis planiceps*, Vigors and Horsfield, departs in many points from the true cats, and approaches *Prionodon* in others. *Felis Temminckii* of the same zoologists, which is near the domestic cat in size, comes nearer in form—it is uniform in colour—to the true *Tiger Cats*, which will be noticed under the article on TIGERS. We must not omit to notice the *Felis Caffra*, a specimen of which is to be seen in the South African Museum (No. 28) specimens of which have been met with, as the Catalogue informs us, in whatever direction South Africa has yet been explored. 'It exhibits certain fixed peculiarities which unequivocally constitute it a distinct species from the domestic cat, which is occasionally found wild in the colony, and with which the former has sometimes been erroneously confounded. It possesses a full share of the ferocity of the feline tribe; and dogs which have once had a specimen of its pugnacious will

and power show a considerable degree of caution in encountering it a second time. It is frequently found in such flats as chance to be covered with long grass or with a moderate growth of brushwood; and when disturbed by the approach of men or dogs, usually seeks shelter in thickets, or the burrows of other animals. It preys upon small quadrupeds and birds, and is an especial enemy to those of the latter which have their nests upon the ground.' (*Catalogue of South African Museum.*)

FOSSIL FELIDÆ.

In the second or Miocene period of the tertiary formations we have hitherto found the first traces of large fossil cats. There are no less than four species of these great cats, some as large as a lion, enumerated by Professor Kaup from the Epplesheim sand near Altzey, about twelve leagues south of Mayence. These remains are preserved in the museum at Darmstadt. The professor names these *Felis aphanista, F. prisca, F. ogygia,* and *F. antediluviana.* In the third and fourth (or Pliocene), divisions of the tertiary periods, we find that the number of terrestrial herbivorous quadrupeds become more abundant; and, with their numerical importance, the *Carnivora,* whose agency was required for keeping them down, increase also. The remains of *Felidæ* occur in the ossiferous caverns, such as those of Kirkdale, Gailenreuth, &c.; and also in the osseous breccias (Nice, &c.). In the cave at Kirkdale the only remains that had been found of the tiger species, according to Dr. Buckland, were two large canine teeth, each 4 inches in length, and a few molar teeth: these exceeded in size those of the largest lion or Bengal tiger. Mr. Cottle of Bristol procured from Oreston Cave, Plymouth, among many other remains, two tusks of a tiger, one 3¾ inches long, the other 3¼, one from the upper, and one from the lower jaw. Dr. Buckland in the same work (*Reliquiæ Diluvianæ*) mentions that Cuvier had then lately found the tusks of an extinct lion or tiger in the breccia of Nice, and that Mr. Pentland had discovered the tooth of the same extinct tiger in the breccia of Antibes. Bavard, the Abbé Croizet, and Jobert, in the work on Fossil Cats, found, among the remains contained in the ossiferous rocks of Auvergne (Puy de Dome) the following species: *Felis Issidoriensis, F. brevirostris, F. pardinensis, F. Avernensis,* and *F. meganteron.*

FELIX I., a native of Rome, succeeded Dionysius the Calabrian as bishop of that city A.D. 271, and suffered martyrdom in 275. He was succeeded by Eutychianus, bishop of Luna. There is extant an epistle of Felix to Maximus, bishop of Alexandria, against Paul of Samosata.

FELIX II., by some styled III., on account of an antipope who assumed the title of Felix II. in the schism against Liberius (A.D. 355-66), was a native of Rome, and succeeded Simplicius in the year 483. He had a dispute upon questions of ecclesiastical supremacy with Acacius, bishop of Constantinople, who was supported by the emperor and by most of the eastern clergy; in consequence of which a schism ensued between the Greek and Latin churches, which continued after the death of Felix, which happened in 492. He was succeeded by Gelasius I.

FELIX III., also called IV., a native of Beneventum, succeeded John I. A.D. 526, and died in 530. He was succeeded by Boniface II.

FELIX V. [AMADEUS VIII.]

FELLOWSHIP, in books of arithmetic, the rule by which profit or loss is divided among those who are to bear it, in proportion to their investments or interests in the transaction. It is usual to divide this rule into two parts, of which the first supposes all the investments to have been made for the same time, and the second supposes the partners to have employed their money during different times. One simple case of each will be sufficient.

Question 1. A, B, and C embarked 10*l.*, 9*l.*, and 8*l.* in a venture which yielded 30*l.* of profit. How much belongs to each?

If 10+9+8, or 27 adventurers embarked 1*l.* each, it is clear that each of them should have the 27th part of 30*l.* Let 10 of them assign their shares to A, 9 to B, and 8 to C, and we have the case in question. That is A, should have 10-27ths, B 9-27ths, and C 8-27ths of the whole profit.

Question 2. A profit of 30*l.* was realized by A embarking 10*l.* for two months, B embarking 9*l.* for three months, and C embarking 8*l.* for four months. How much ought each to gain?

Here the 1*l.* of A and the 1*l.* of B are differently circumstanced: the second was employed half as long again as the first, and consequently should gain half as much again. Now let *one pound sterling employed during one month* be called a share: then A invested 20 shares, B 27 shares, and C 32 shares. Hence as before, 20+27+32 being 79, A should have 20-79ths, B should have 27-79ths, and C 32-79ths of the gain.

The first is a rule of very frequent occurrence, but the second is rare, for it seldom happens that money is withdrawn from an undertaking, except upon some specific agreement.

FELLOWSHIP (in a college) is an establishment in the college entitling the holder to a share in its revenues. The fellows are a part of the corporation. [COLLEGE.] Fellowships are either original, that is, part of the foundation or scheme of the original founder; or ingrafted, that is, endowed by subsequent benefactors of a college already established. Where the number of fellows is limited by the original foundation, new fellows cannot be made members of the corporate body without a new incorporation. If the number is not limited by the charter, it seems that the corporation may admit new fellows as members, who will be subject to the statutes of the original foundation in all respects. Graduates of each several college are in general only eligible to fill a vacant fellowship in the establishment to which they are elected after having undergone an examination by the master and fellows in being. But in some cases special rules which control the election prevail, as where the fellow must be of the blood of the founder, or where he must be a native of a particular county, &c., and in some few cases fellowships are open to the graduates of several colleges, or even the whole university. In Downing College graduates of both universities are eligible. These rules are prescribed by the founder, modified in some cases by the bye-laws of the several colleges. Some few fellowships may be held by laymen, but in general they can be retained only by persons already in holy orders, or who are ordained within a specified time. Fellowships are of unequal value, varying from 30*l.* and less to 250*l.* a year and upwards, the senior fellowships being in general the most lucrative; but all confer upon their holders the right to apartments in the college, and certain privileges as to commons or meals. They are in general tenable for life, unless the holder marries, or inherits estates which afford a larger revenue, or accepts one of the livings belonging to the college which cannot be held with a fellowship. These livings are conferred upon the fellows, who in general have the option of taking them in order of seniority, though in some colleges the holders of particular offices have priority of choice, as for instance in Trinity College, Cambridge, where the vice-master has such right by a bye-law of the college.

FELLTHAM, OWEN, lived in the time of James I.; but the particulars of his life are entirely unknown. To the lover of English literary antiquities he is known as the author of a curious book called 'Resolves,' consisting of pious and moral treatises collected into *centuries.* It somewhat resembles Lord Bacon's essays, and exhibits an exuberance of wit and fancy that is perfectly astonishing. Metaphor follows metaphor; and they are not merely introduced as an idle and unmeaning sport, but are the exponents of thoughts in themselves acute and profound. All liberal minds must admire the spirit in which the book is written. Felltham displays himself as a man delighting in reflection, and at the same time as a man of the world; as one of sincere and fervent piety, but at the same time as one of a cheerful and lively temper, loving the good things of this life, and always preserving a clear understanding. An excellent account of the book with copious extracts, will be found in the *Retrospective Review,* vol. x.

FELO-DE-SE (a felon of himself) is a person who, being of sound mind and of the age of discretion, deliberately causes his own death; and also in some cases, where one maliciously attempts to kill another, and in pursuance of such attempt unwillingly kills himself, he is adjudged a felo-de-se (1 Hawk. P. C. c. 27, § 4). When the deceased is found by the coroner a felo-de-se, all his chattels, real and personal, are forfeited to the crown, though they are, we believe, usually restored upon payment of moderate fees, and therefore a will made by him is void as to his personal estate, though not as to his real estate, nor is his wife barred of her dower. Formerly he was buried in the highway with

a stake driven through his body. These laws, so highly repugnant to the feelings of humanity, being a punishment to the surviving relatives of the deceased, in addition to the general impression that no man in his sound sense ever does commit suicide, caused juries in general to find that the deceased was not of sound mind; and by a recent enactment (4 Geo. IV. c. 52) the legislature has so far yielded to the popular and herein the better opinion, as to abolish the former ignominious mode of burial, and to provide that a felo-de-se shall be privately interred at night in the burial-ground in which his remains might by law have been interred if the verdict of felo-de-se had not been found against him.

FELONY, in the general acceptation of the English law, comprises every species of crime which occasioned at common law the forfeiture of lands or goods, or both, and to which a capital or other punishment might be superadded, according to the degree of guilt. Various derivations of the word have been suggested. Sir Henry Spelman supposes that it may have come from the Teutonic or German 'fee' (fief or feud) and 'lon' (price or value), or from the Saxon 'feelen,' to fall or offend. Capital punishment by no means enters into the true idea and definition of felony; but the common notion of felony has been so generally connected with that of capital punishment that law-writers have found it difficult to separate them: indeed, this notion acquired such force, that if a statute made any new offence felony, the law implied that it should be punished with death. The number of offences, however, to which this punishment is affixed by the law of England is now very small; and several statutes have been passed in the last session of parliament (1 Vict.) founded upon the principle that the punishment of death should only be inflicted for crimes accompanied with violence. Thus c. 84 substitutes the punishment of transportation for that of death in those cases where the latter might still be inflicted for forgery; c. 85 materially lessens the severity of the punishment of offences against the person; c. 86 enacts that burglary unaccompanied with violence shall no longer be punished capitally, and provides that, so far as the offence of burglary is concerned, the night shall be considered to commence at nine in the evening and to conclude at six in the morning; c. 87 mitigates the punishment attending the crimes of robbery and stealing from the person: c. 88 renders piracy punishable with death only when murder is attempted; c. 89 regulates the punishment for the crime of arson; c. 90 mitigates the punishment of transportation for life in certain cases; and c. 91 abolishes the punishment of death in the cases there specified. (14 *Leg. Obs.* 426.) Great numbers of offences were formerly liable to this severe punishment; and it must seem strange to persons who do not observe the extreme difficulty with which old established customs and prejudices, however ill founded, are subverted, that this system should so long and so obstinately have withstood the most convincing arguments and conclusive statistical evidence. It is impossible, within the limits of this article, to enumerate the crimes which the law considers to be felonies; and the more so, as the word felony has long been used to signify the degree of crime rather than the penal consequences. It may be sufficient, therefore, to state generally, that murder, manslaughter, felo-de-se, robbery, arson, burglary, offences against the coin, &c. are considered and classed as felonies.

Besides the special punishment affixed to his crime by the law, a felon upon conviction forfeited the rents and profits of his lands of inheritance during his life to the king (which are now usually compounded for), and also all his goods and chattels absolutely; and as attainder of felony caused corruption of blood, his lands, except of gavelkind tenure, escheated to the lord of the fee. This last consequence, however, was taken away by stat. 54 Geo. III. c. 145, which enacted that, except for treason or murder, corruption of blood should not follow attainder; and as difficulties might sometimes occur in tracing descent through an ancestor who had been attainted, it was, by the 3 and 4 Will. IV. c. 106, § 10, enacted that descent may be traced through any person who shall have been attainted before such descent shall have taken place. [ESCHEAT; FORFEITURE.]

In connexion with this subject it may be interesting to refer to the distinction formerly taken between felony with and without benefit of clergy, as explained in the article BENEFIT OF CLERGY.

FELSO-BANYA. [SZATHMAR.]

FELSPAR, a mineral which occurs in every part of the earth, and one of the constituents of granite.

It occurs *crystalline* and *massive*. The primary form of the crystal is an oblique rhombic prism. Colour white, grey, green, red, of different shades. Transparent, translucent, or opaque. Lustre vitreous. Sp. gr. 2.5, 2.6. Hardness 6.0. Streak greyish white. Cleavage parallel to the terminal plane and oblique diagonal. Fracture conchoidal, uneven.

The variety known by the name of *adularia* occurs in large crystals, especially in Mont St. Gothard. *Moon-stone* is a variety which has a pearly lustre, and when cut and polished is chatoyant; the finest specimens of this are from Ceylon.

Massive varieties.—Amorphous. Structure granular, compact. A green variety has been found in Siberia. The several varieties differ but little in composition. *Adularia*, which is one of the purest varieties, according to Vauquelin, consists of

Silica . .	64
Alumina . .	20
Potash . .	14
Lime . .	2
	100

FELT, FELTING. [HAT.]

FELTON. [BUCKINGHAM, DUKE OF.]

FELTRE. [BELLUNO.]

FELUCCA (Felúca in Italian, Felouque in French, Falúca or Falúa in Spanish), a vessel or small craft used in the Mediterranean for coasting voyages, being propelled both by oars and sails. It may be said to be a small galley. The feluccas carry two masts, main and fore, with lateen sails. They are very frequent on the coast of Italy, Spain, and the Levant. There are also armed feluccas which carry two guns, and which are in fact a kind of gunboats, and larger and stronger built than the merchant felucca. (*Encyclopédie Methodique, Marine*, art. *Felouque.*)

FEME-SOLE. [WIFE.]

FEMERN. [SCHLESWIG.]

FEMININE. [GENDER.]

FENCES are necessary wherever cattle are depastured and properties divided: and according as they are intended to prevent men or cattle from trespassing over them, they are formed of various materials and dimensions.

When a park is inclosed to keep in deer and game, the best fence is a stone or brick wall, well built with lime mortar: but as this is expensive where stone and lime are not at hand, the common *park-paling* is more frequently met with. This is composed of posts and rails of oak morticed and pinned together, and split pales of the same material nailed upon these in an upright position. The pales are split out of the trunks of oaks, where there are no branches or knots, when the sap is still in them. They are about half an inch thick and with feather edges, that is, diminishing in thickness from one side to the other: their usual width is five inches. When they are nailed on the rails, which are usually of a triangular form, the thickest edge of one pale is nailed over the thinner edge of the preceding, forming thus a very close fence. Every alternate pale is placed three or four inches higher than its neighbour, which gives the top of the fence a castellated form. This is not done merely for the appearance; but it makes it more difficult to climb over, and the deer are not so apt to leap at it as if the top were a straight line. The distance between the posts is usually nine feet; and the three rails with the pales nailed on them is called a pannel, and may be conveniently moved at once when any alteration in the fence is required. A whole fence may be moved at a small expense, merely by digging out the posts, and placing them elsewhere. The pannels come in regularly, and are pinned into the old mortices in the posts. Sometimes the pales are nailed at a distance from each other, which makes the *open-paled fence*, and the pales are then generally cut to a point at top. This fence is peculiar to Great Britain and Ireland and is very seldom found on the Continent.

In the Jura and the Alps, where wood abounds, a rough fence is frequently made with strong split pieces of wood, which are fixed obliquely in the ground and supported at the upper end by two others placed in the form of a cross. It is not a very strong fence, but it is sufficient to prevent the cows from straying, for unless a bull with his horns makes a gap in it, they will not attempt to pass it.

In wild mountain pastures in Scotland and Ireland it is usual to separate the properties of different individuals or that of parishes by rough stone walls put together without any mortar. The materials are generally at hand, and a rough and efficient fence is made without much labour.

Some of these walls are built with considerable skill, and are very durable; especially if the stone is of a nature to split with a flat surface; in which case a dry wall may be built which has all the appearance of one built with mortar. Sometimes a layer of mortar is laid on the stones at a little distance from the ground and another near the top. The coping is usually made of flat stones, which are sometimes placed on edge in a direction across the wall, and wedged together along the top of it or set in mortar, forming a very rough coping, which it is not easy to get over.

Where stones are not at hand, or less trouble is taken, a high bank of earth faced with sods of grass is substituted for a wall. This is not so durable and is more easily surmounted, unless a hedge of some kind be planted along the top. Furze seed is often sown for this purpose, and soon forms an excellent fence, which by proper care and clipping will last a long time. But the most common kind of fence for fields is the hedge and ditch, the bank being raised with the sods and earth taken out of the ditch, and the hedge planted in the side of the bank towards the ditch, or on the top. Sometimes there is a ditch on both sides. In flat wet lands this last is extremely useful, not only as a fence but as a drain for the superfluous water. When the ditch is intended to carry off the water, and there is only one, it is of consequence that it should be so placed as to answer this purpose effectually; it should therefore always be on that side of the bank where the ground rises, for otherwise the bank will impede the natural flow of the water, and it will be necessary to cut through it in different places to let the water running from above have an outlet into the ditch. In some extensive inclosures of land great inconvenience has arisen from the neglect of the surveyor in not attending to this circumstance and setting out the bank on the upper side. Where they are not required as drains, it is a great waste of land to have any ditches, and a simple hedge planted on the surface of the soil is much to be preferred. Of all fences a live hedge, which is carefully planted, and kept properly cut, and trimmed when it is grown up, is by far the best. [HEDGE.]

When a fence is required within sight of a dwelling, and it is desirable for it to be concealed, a deep ditch is sometimes dug, and a fence placed in the bottom of it at such a depth as not to appear above the level of the ground. This is called a *sunk fence*. Sometimes a wall is built against a perpendicular side of a ditch, and some very light fence is placed obliquely outwards near the top of it and level with the ground. This is called a *ha-ha fence*, a name given to it from the surprise excited in a person unacquainted with it, when he suddenly finds himself on the top of a wall with a deep ditch before him. When it is desired to keep off sheep or cattle from a lawn or pleasure-ground without obstructing the view of the park or the fields, the ha-ha fence is very useful. A variety of *light fences of iron* have been invented for the same purpose: some of these are fixed and others moveable: some have upright pieces of cast-iron as posts let into oak blocks sunk in the ground, and rods of wrought-iron passing through holes in the uprights: some have wire for the same purpose. But the most common iron fence is composed of separate wrought-iron hurdles, which may be moved at pleasure, and are kept together by screwed pins and nuts. They are merely stuck into the ground, for which purpose they have the ends of the uprights sharpened and bent so as to form a foot. By having this bend alternately on the right and on the left, they form a very firm basis when two hurdles are joined, the left foot of the one being strengthened by the right foot of the other. A very neat fence may be made at a small expense by using as posts pieces of young larch trees about four or five inches in diameter, with the bark on, and passing iron rods through holes bored in them at certain distances from each other. A fence of this kind, five feet high, with five horizontal rods five-eighths of an inch in diameter, is an excellent protection against cattle, and takes up no ground.

The greatest objection to the ditch and bank fence is that it takes up so much room. If the ditch is three feet wide, the bank will be the same. There is a foot along the ditch, and another along the bank, where the plough cannot reach; there are therefore eight feet lost. If the fields are squares of ten acres each, which is a convenient size, each field will have 1320 feet of fence in length, taking up 10,560 square feet of land, which is nearly a quarter of an acre. If to this be added the outer fences against roads, woods, or commons, it will be found that nearly one acre in 25 is taken up by banks and ditches. It is therefore a great saving to have a simple hedge without any ditch wherever the land is well drained or has a porous subsoil.

It is usual in England to plant trees in the hedge rows; and it is owing to this practice that England presents such a rich garden-like appearance, wherever there is a hill which enables one to see any extent of country. But trees are a great detriment to the farmer; and where the land is highly manured, the trees draw off much of the rich juices. The prudent tenant considers this in the rent; and although the landlord may now and then sell some timber, he pays dear for it in general by the annual deduction from his income on their account. Stone walls have a dreary appearance to the eye, but they are excellent fences; they take up little ground, they draw nothing out of the soil, they harbour no birds, and they are the best shelter against cold winds in spring. In an agricultural point of view, therefore, walls are to be preferred, unless the soil be favourable to the growth of the white-thorn or the holly; for clipped hedges are kept up at a much smaller expense than walls; and where there is no ditch, hedges take up as little room.

When hedges are preferred, whether with or without a bank and ditch, they must be protected until they are of a certain age; and for this purpose there are particular kinds of fences. When there is a bank and double ditch, and the hedge is planted on the top of the bank, which makes by far the most efficient fence, there are usually two fences, one on each side of the bank. These fences are made of rough posts, and rails morticed into the posts. The posts are a foot or 18 inches in the ground, and 2 feet 6 inches out. They are placed in the side of the bank, inclined somewhat outwards, about 4 feet 6 inches asunder. The two rails are let into mortices in the alternate posts, and nailed to the middle post, which is rather slighter. Thus a very formidable fence is made, which those who follow the diversion of hunting, and are not very well mounted, dread to encounter. If there is only a single ditch, it is usual to plant the hedge in the side of the bank a little above the level of the ground. To protect the young thorns from being cropped by the cattle, it is usual to make a dead hedge of stakes with bushes and brambles interwoven on the top of the bank; and if there is pasture land on the side where the ditch is, a post and rail fence is put up along the edge of the ditch till the hedge is grown sufficiently not to be injured by the cattle. When branches of thorns and bushes only are used without stakes, it is called a *foot hedge*; when the branches are interwoven, and the top of the hedge is finished with rods wattled in, it is called a *stake and edder hedge*. Wherever neatness and durability are consulted, the stake and edder hedge is always preferred.

Besides these common fences, there are various others of a light or temporary nature, which are chiefly used in gardens and pleasure-grounds, and also when sheep only are to be kept out, or when a new quick hedge along an orchard or garden has been planted. A cheap and neat fence of this kind is made with stakes only planted in the ground, forming a series of St. Andrew's crosses; or with osier or hazel rods worked between stakes like basket-work, either horizontally and lightly or obliquely and closely. When the rods are split, the appearance is still neater and lighter. A variety of light iron fences made of slender rods or wire have been invented to protect flower-gardens or shrubberies from the depredations of hares and rabbits, and their forms differ according to the fancy and taste of individuals.

FENELON, FRANÇOIS DE SALIGNAC DE LAMOTHE, was born at the Château de Fenelon, in Périgord, in the year 1651. So rapid was his progress that he preached a sermon at the early age of fifteen before a select assembly at Paris, whither he had been called by his uncle, the Marquis de Fenelon, who afterwards fearing lest the praises of the world should create pride and vanity caused him to enter the seminary of St. Sulpice, and there for several years imitate 'the silence of Jesus.' Here he took orders. His first work was a treatise, 'De l'Education des Filles,' which is well known, and has been translated into our language. The intimacy which he formed with

Bossuet, and Bossuet's example, led him to write a treatise against heretics, entitled 'Du Ministère des Pasteurs,' in which heretics are attacked, though with more moderation than they had been by Bossuet. Fenelon being intrusted by Louis XIV. with a mission to Poitou, to convert the Protestants, nobly refused the aid of dragoons, and employed persuasion alone as an instrument of conversion. His conduct on this occasion gained him many friends. In 1689 he was appointed tutor to the young duke of Burgundy, which brought him into attendance on the court. Though the polish and grace which pervade his writings extended to his conversation, he never seems to have been a great favourite of Louis; his political opinions always tended to liberality, and in a letter to Mad. de Maintenon he animadverted rather freely on the character of the king. Notwithstanding this, after he had been tutor for five years, Louis made him archbishop of Cambray. Unfortunately, at the very moment when he had gained this elevated post, that series of events commenced which caused his future disgrace. He formed an acquaintance with the celebrated quietist, Mad. Guyon, who was at first in high favour with Mad. de Maintenon, and who was encouraged by her to spread her doctrines at St. Cyr. This lady was afterwards persecuted by Bossuet; and as Fenelon was suspected of favouring her doctrines, Bossuet required him to condemn them. Not only did Fenelon refuse, but he published a book called 'Explication des Maximes des Saints,' in which the principles of quietism were openly avowed. Upon this, Bossuet denounced him to the king as a heretic. To increase his troubles, his palace caught fire about the same time, and all his MSS. and books were destroyed. The persecution of Bossuet continued; and the protection of Mad. de Maintenon, who had at first encouraged Fenelon, was withdrawn. Bossuet required that the difference should be settled by a controversy: Fenelon would not accede to these terms, but offered to submit his book to the tribunal at Rome. His persecutor however succeeded so far as to cause him to be banished from the court, and endeavoured, though unsuccessfully, to involve Beauvilliers, governor to the duke of Burgundy, in his disgrace. Pope Innocent VIII., though strongly urged by Louis, was not willing at once to condemn a prelate so noted for learning and piety, and a violent paper war was waged by both parties. At last the papal letter arrived, and the archbishop of Cambray was forced to submit; he signed a renunciation, and would have been restored to regal favour had not the celebrated romance of 'Telemaque,' which he had written some years before, been published against his will through the treachery of a servant. Several passages in this work were suspected by Louis to be directed against himself; it was suppressed in France, but rapidly circulated in Holland. Hearing of the unfortunate impression which his book had made, Fenelon resolved to remain quietly in his diocese. Cambray being situated on the frontiers of France, he was visited by many illustrious foreigners. Fenelon's acts of benevolence were munificent: in the year 1709 he fed the French army at his own expense. It has been already remarked that his political opinions were liberal; he had always conceived it just that the people should have a share in the government, and it was expected that the duke of Burgundy would have acted in accordance with his preceptor's views. But all hopes of this sort were cut off by the sudden death of that prince. Fenelon himself died in 1517.

The works of Fenelon are very numerous; consisting, besides the romance of 'Telemaque,' of a variety of religious and moral treatises. 'Telemaque' has been translated into every European language, and is read at almost every European school. Had it been written in this age, it is questionable whether its popularity would have been so great; the spirit of the Greeks is much better understood than it was formerly, and the classic reader, though he may admire the language of 'Telemaque,' as well as the general accuracy of the writer's information on matters of antient history and geography, will find it strange that the sentimental speeches, though good in themselves, should flow from the mouth of Homeric heroes, who of all beings were the least moralising, in the modern sense of the word. His religious and moral essays are only calculated for persons in whose mental constitution warmth and susceptibility are predominant, and who can suffer themselves to be led on by the fervour and eloquence of the author. To the cool and more intellectual inquirer after truth his works will be diffuse and tedious. So much use does he make of the imaginative faculties, that he exhorts teachers to impress on the minds of children that the Deity is sitting on a throne, with very bright eyes looking through everything, and supporting the universe with his hands. Hence his natural theology is chiefly the ejaculation of a pious man admiring the works of Nature. In politics, Fenelon's opinions are far in advance of his age and country: in one of his treatises he declaims against checking liberty of conscience, and boldly proclaims the injustice of levying taxes without the sanction of a parliament. A handsome quarto edition of his works was published at Paris in 1787.

FENNEC. [Fox.]

FENNEL. [FŒNICULUM.]

FENTON, ELIJAH, was born in Staffordshire in the year 1683. Being designed for the church, he was admitted a pensioner of Jesus College, Cambridge, in 1700. After taking a bachelor's degree, he was forced to leave the university in consequence of being a non-juror. He became secretary to the earl of Orrery, and accompanied that nobleman to Flanders. After his return to England in 1705, he accepted the situation of assistant at Mr. Bonwicke's school at Headly in Surrey, and subsequently became head-master of the free grammar-school at Sevenoaks in Kent. Mr. St. John (afterwards Lord Bolingbroke) persuaded him to retire from this school, promising to do great things for him, which promises were never fulfilled. Lord Orrery again befriended him, and made him tutor to his son, Lord Broghill. This office lasted for six or seven years, during which Fenton became acquainted with Pope, and assisted him in the translation of the 'Odyssey.' The first, fourth, nineteenth, and twentieth books are said to be the work of Fenton. In 1723 he produced at the theatre in Lincoln's Inn Fields a tragedy called 'Mariamne,' which was so successful that he is reported to have gained 1000*l*. by its representation, and to have employed great part of the money in paying off the debts which St. John's conduct had caused him to incur. In 1727 he revised a new edition of Milton's works, and prefixed a life of the author; and in 1729 he published a fine edition of Waller. Through the recommendation of Pope, he became tutor to the son of Lady Trumbull; and when that occupation was at an end, she made him auditor of her accounts. He died in 1730.

All biographers bear testimony to Fenton's character as an upright and honourable man. His poetical works are but few in number, and consist of short pieces, chiefly paraphrases from the antients. As they have scarcely any merit but that of correct versification, they will probably never be rescued from the neglect into which they now have sunk. The tragedy of 'Mariamne,' like most of that time, is totally forgotten.

FENUGREEK. [TRIGONELLA.]

FEOD. [FEUDAL SYSTEM.]

FEODO'SIA. [KAFFA.]

FEOFFMENT (in law) is that mode of conveyance of lands or real hereditaments in possession where the land passes by force of livery in deed, *i. e.* actual delivery of a portion of the land, as a twig or a turf; or where the parties being on the land the feoffor expressly gives it to the feoffee, &c.; or livery in law or within view, *i.e.* where the parties being within sight of the land, the feoffor refers to it and gives it to the feoffee. A feoffment was the earliest mode of conveying real hereditaments in possession known to the common law. A grant [DEED; GRANT] was the mode used when lands subject to an existing estate of freehold, and when rents or other incorporeal hereditaments incapable from their nature of being the subjects of livery, were transferred. The term feoffment is evidently of feudal origin, its latinised form being feoffamentum, from feudare or infeudare, to infeoff, to give a feud. The mode of conveyance is however of much higher antiquity than the feudal system, the mode of transferring property by the delivery of possession being common to all nations in rude ages. (Gilb. *Ten.* 386.) It prevailed amongst the Anglo-Saxons, who gave possession by the delivery of a twig or a turf, a mode still common, particularly in the admission of tenants of copyhold lands. The form of an antient feoffment was singularly concise. There is a copy of one in the Appendix to the 2nd vol. of Blackstone's *Commentaries*, No. 1.

The essential part of this mode of conveyance is the delivery of possession, or, as it is technically called, livery of seisin. In former times land was frequently conveyed without any deed or writing, by simple delivery. Subsequently

it became the custom to have a written instrument called the charter or deed of feoffment [CHARTER], which declared the intention of the parties to the conveyance. But now, since the Statute of Frauds (29 Car. II. § 3), a written instrument is necessary. Still however the land passes by the livery, for if a deed of feoffment is made without livery, an estate at will only passes [ESTATE]; though if livery is made, and the deed does not express that the land is conveyed to the feoffee and his heirs, an estate for the life of the feoffee only will pass. No less estate than an estate of freehold can pass by a feoffment with livery, the livery being in fact the investiture with the freehold.

Livery of seisin, of both the kinds previously mentioned, was at first performed in the presence of the freeholders of the neighbourhood, vassals of the feudal lord; because any dispute relating to the freehold was decided before them as pares curiæ, 'equals of the court,' of the lord of the fee. But afterwards, upon the decay of the feudal system, the livery was made in the presence of any witnesses; and where a deed was used, the livery was attested by those who were present at it.

Livery in deed may be made by the feoffor or his attorney to the feoffee or his attorney. When lands lie in several counties, as many liveries are necessary; and where lands are out on lease, there must be as many liveries as there are tenants, for no livery can be made but by the consent of the tenant in possession, and the consent of one will not bind the rest. But livery in law or within view can only be given and taken by the parties themselves, though lands in several counties may pass if they all be within view. Livery of this nature requires to be perfected by subsequent entry in the lifetime of the feoffor. Formerly, if the feoffee durst not enter for fear of his life or bodily harm, his claim, made yearly in the form prescribed by law, and called continual claim, would preserve his right. The security of property consequent upon the progress of civilization having rendered this exception unnecessary, it was abolished by the recent Statute of Limitations, 3 & 4 Will. IV., c. 27 § 11.

Since the Statute of Uses [BARGAIN; SALE; USES] has introduced a more convenient mode of conveyance, feoffments have been rarely used in practice, and then rather for their supposed peculiar effects, as wrongful conveyances [CONVEYANCES], than as simple means of transferring property. It has been usual to make corporations convey their own estates by feoffment, in consequence of the supposition that a corporate body cannot stand seised to a use, though it seems that this doctrine only applies to the case of lands being conveyed to a corporation to the use of others. (Gilb. *on Uses*, Sugd. Ed. 7 note.) Where the object to be attained was the destruction of contingent remainders or the discontinuance of an estate tail, or the acquirement of a fee for the purpose of levying a fine [FINE] or suffering a recovery [RECOVERY], a feoffment was usually employed. Such indeed was the efficacy attributed to this mode of conveyance by the earlier law writers, that where the feoffor was in possession, however unfounded his title might be, yet his feoffment passed a fee; voidable, it is true, by the rightful owner, but which by the lapse of time might become good even as against him. Being thus supposed to operate as a disseisin to the rightful owner, it was thought till recently that a person entitled to a term of years might by making a feoffment to a stranger pass a fee to him, and then by levying a fine acquire a title by non-claim. This doctrine led to very considerable discussion, and though strictly accordant to the principle of the old law, yet being alike repugnant to the principles of justice and to common sense, it has been overruled. In the progress of the discussion which ended in overturning the doctrine, arguments against its justice and expediency were used, rather than those founded upon the principles of law, and the bench even resorted to ridicule. Mr. Baron Graham in one case observed, 'Yet is this pretended possession of paper and packthread to be called by the tremendous name of disseisin.' The whole state of the question may be found in Mr. Knowler's celebrated argument in Taylor dem. Atkins *v.* Horde; 1 Burr. 60, Doe dem. Maddock *v.* Lynes, 3 B. & C. 382; Jerritt *v.* Wrace, 3 Price, 575; 1 Sand. *Uses*, 40 (4th ed.); 1 Prest. *Conv.* 32 (2nd ed.); and 4 Bythew. *Conv.* (Jarman's edit.), 117.

The owner of lands of gavelkind tenure [GAVELKIND] may convey them by feoffment at the age of 15; and therefore in such cases, which are necessarily rare, a feoffment is still resorted to. It is also frequently used for the sake of economy upon small purchases, in order to save the expense of a second deed, which is necessary where the conveyance is by lease and release.

FERÆ (Zoology), the third order of *Mammalia*, according to Linnæus. The following is his character of the order: upper incisor teeth (*primores*) six, rather acute (*acutiusculi*); canine teeth solitary. The order contains the following genera:—1. *Phoca* (the Seals); 2. *Canis* (the Dogs, Wolves, Foxes, Hyænas, and Jackals); 3. *Felis* (the Cats, Lions, Tigers, Leopards, Lynxes, and smaller cats); 4. *Viverra* (the Ichneumons, Coatis, Skunk (*Putorius*), Civets, and Genets); 5. *Mustela* (the Otters, Glutton, Martens, Pole-cats, Ferrets, and Weasels, including the Ermine, &c.); 6. *Ursus* (Bears, Badgers, and Racoons); 7. *Didelphis* (the Opossums); 8. *Talpa* (the Moles); 9. *Sorex* (the Shrews); 10. *Erinaceus* (the Hedge-hogs). Linnæus places the *Feræ* between the orders *Bruta* and *Glires*.

FERDINAND I. of Austria, younger brother of Charles V., born in 1503, was elected king of the Romans during his brother's reign, and succeeded him as emperor in consequence of the abdication of Charles, which was sanctioned by the diet of the empire in 1558. Ferdinand had married in 1521 Anna, daughter of Ladislaus VI., king of Bohemia and Hungary, and sister of Louis, who having succeeded his father in the crown of those realms, was killed in the disastrous battle of Mohacz by the Turks in 1526, and left no issue. Ferdinand, claiming a right to the succession in the name of his wife, the states of Bohemia acknowledged him, but in Hungary a strong party declared for John of Zapoli, palatine of Transylvania. This was the beginning of a long and desolating war, interrupted by occasional truces, in which Solyman, sultan of the Turks, interfered on behalf of John, and after John's death in 1540, on behalf of his son Sigismund, who continued to hold a part of Hungary till the death of Ferdinand. In Bohemia the religious disputes between the Calixtines, who were a remnant of the Hussites and the Roman Catholics, occasioned considerable uneasiness to Ferdinand, who found at last that it was his policy to tolerate the former. At the same time however he effected a thorough change in the institutions of that kingdom by declaring the crown of Bohemia hereditary in his family, without the sanction of the states. This gave rise to a confederacy which opposed Ferdinand by force of arms, but was at length overpowered and dissolved. On being proclaimed Emperor of Germany, after having signed certain conditions with the electors, which defined the boundaries of the imperial authority and gave security to the Protestant religion, Ferdinand notified his election to Pope Paul IV., expressing a desire to be crowned by his hands. Paul refused, under the plea that the abdication of Charles V. was effected without the consent of the papal see, and required a fresh election to be made. Ferdinand, indignant at these pretensions, ordered his ambassador to quit Rome. Paul however dying soon after, his successor, Pius IV., showed himself more tractable in acknowledging Ferdinand as head of the empire. It was then resolved by the electors, Protestant as well as Catholic, that in future no emperor should receive the crown from the hands of the pope, and that, instead of the customary form in which the emperor elect professed his obedience to the head of the church, a mere complimentary epistle should be substituted; and this was observed on the election of Maximilian, son of Ferdinand, as king of the Romans, a title which ensured his succession to the empire. Thus ended the last remains of that temporal dependence of the German empire on the see of Rome which had been the subject of so many controversies and wars.

Ferdinand continued throughout his reign to hold the balance even between the Protestants and Catholics with regard to their mutual toleration and outward harmony; he even endeavoured, though unsuccessfully, to effect a union of the two communions, by trying to persuade the Protestants to send deputies to and acknowledge the authority of the council assembled at Trent. This however they refused to do, unless their theologians were acknowledged as equal in dignity to the Roman Catholic bishops, and unless the council were transferred from Trent to some city of the empire. Ferdinand, on the other side, in order to conciliate some at least of the various dissenting sects in his own hereditary states, attempted to obtain of the pope, among other concessions, the use of the cup at the communion-table for the laity, and the liberty of marriage for the priests. Pius IV.

however, moderate as he was, would not listen to these two concessions, especially the latter, and the negotiations were still pending with regard to the former, when the emperor died at Vienna in July, 1564. He left three sons: 1, Maximilian, who succeeded him as emperor, archduke of Austria, and king of Bohemia and Hungary; 2, Ferdinand, whom he made count of Tyrol; 3, Charles, whom he appointed duke of Styria, Carinthia, and Carniola. Upon the whole, the administration of Ferdinand was able and enlightened; he maintained religious peace in Germany, he effected some useful reforms, and he saw the closing of the council of Trent. (Coxe, *History of the House of Austria*; Dunham, *History of the Germanic Empire*.)

FERDINAND II. of Austria, son of Charles, duke of Styria, and grandson of Ferdinand I., succeeded his cousin Matthias in 1619. But the states of Bohemia, who were already in open revolt against Matthias, both from political and religious grievances, refused to acknowledge Ferdinand, and declared the throne vacant. Count Thorn, who was at the head of the Bohemian insurgents, was joined by the dissidents of Moravia, Silesia, and Upper Austria, and Ferdinand found himself besieged within the walls of Vienna by the rebels, who threatened to put to death his ministers, as they had done with the governor of Prague and his secretary, whom they had hurled from the windows of the town-house, and to confine Ferdinand himself in a monastery, and educate his children in the Protestant faith. His friends however found means to raise the siege, and Ferdinand hastened to Germany to claim the imperial crown, having been acknowledged king of the Romans during the reign of his predecessor. He carried his election by means of the Catholic electors, who formed the majority. But the Bohemian states elected as their king Frederic, Count Palatine, son-in-law of James I. of England, and Hungary joined in the revolt, supported by Bethlehem Gabor, prince of Transylvania. This was the beginning of the Thirty Years' War, a war both religious and political, and one of the most desolating in the history of modern Europe. In the midst of these difficulties Ferdinand was ably supported by his general, Count de Tilly, who reconquered Bohemia and expelled Frederic. Hungary was soon after obliged to submit, and Bethlehem Gabor sued for peace. Another confederacy was formed against Ferdinand by the Protestant states of Saxony, supported by Christian IV. of Denmark, who put himself at their head in 1625. Ferdinand opposed to him Tilly and Waldstein, or Wallenstein, another commander of extraordinary abilities. In two campaigns the confederates were defeated, Christian was driven into his hereditary states, and the peace of Lubeck, 1629, put an end to the war. Ferdinand now adopted measures of retaliation which drove the Protestants to despair: he abolished the exercise of the Protestant religion in Bohemia; he exiled or put to death the leaders of that and other dissident communions; he confiscated their property; seven hundred noble families were proscribed, and the common people were forced to change their faith. Above 30,000 families, preferring their consciences to their country, sought refuge in Protestant states. Ferdinand intended to carry on the same sweeping measures throughout Germany, but here he adopted a more cautious plan. He began by dividing the Protestants or Lutherans from the Calvinists, and he called for the execution of a former act which allowed to the former only the free exercise of their religion, but condemned the Calvinists to apostacy or exile. He also insisted on the restitution of such ecclesiastical property as the Protestants had seized since the treaty of Passau in 1532. The Protestant princes were compelled in many cases to give up the lands and revenues which they had seized to the monastic and collegiate bodies, their former owners. But the Catholic princes prevented the entire execution of the decree. They had themselves, in the general confusion which followed the reformation, seized upon ecclesiastical property, which they did not wish to restore, and they moreover felt jealous of the threatening power of the house of Austria, allied as it was to the Spanish branch of the same house. They feared also that they might be made as completely dependent upon the emperor as the grandees of Spain had become upon their king. In this feeling they secretly encouraged their Protestant countrymen in resisting the further execution of the decree. The diet at Ratisbon, on Ferdinand's request that his son Maximilian might be elected king of the Romans, replied by insisting that the emperor should reduce his army and dismiss Waldstein, who had rendered himself hateful by the disorders of his troops. Soon afterwards Gustavus Adolphus landed in Pomerania, and put himself at the head of the Protestant party in Germany. The events of the memorable campaigns that followed are well known from Schiller's 'Thirty Years' War,' and other historians. [GUSTAVUS ADOLPHUS.] The Protestant cause triumphed in Germany until Gustavus fell at the battle of Lutzen, 1632, after which the Swedes and German Protestants continued the war; but the victory of Nordlingen, gained by Ferdinand, eldest son of the emperor, had the effect of detaching the elector of Saxony from the Swedes, an example followed by almost all the other German states. Ferdinand died in February, 1637, after having witnessed the election and coronation of his son Ferdinand as king of the Romans.

Ferdinand II. reigned in very troubled times; his bigotry and intolerance were the cause of most of his troubles, but he was not deficient in abilities or perseverance. His connivance at the assassination of his best general, Waldstein, whose ambition and arrogance had made him suspected and feared, is an everlasting blot on his memory.

FERDINAND III., son of Ferdinand II., had to continue the war against the Swedes, who had been joined by the French, for several years more, until the peace of Westphalia, 1648, put an end to the desolating struggle. This celebrated treaty forms an important epoch in the history of Germany and of Europe. The remainder of the reign of Ferdinand III. was passed in tranquillity. He died in 1657, leaving behind him the character of a wise, temperate, and a brave prince. He was succeeded by his son, Leopold I.

FERDINAND I. of Naples was the natural son of Alfonso V. of Aragon and of Sicily. His father obtained of the Neapolitan barons in parliament assembled, in 1442, the acknowledgment of Ferdinand, as duke of Calabria and heir to the crown of Naples, thus securing to his favourite and only son one of his several kingdoms, as Aragon, Sardinia, and Sicily devolved upon John of Aragon, Alfonso's brother. In 1458, after the death of his father, Ferdinand assumed the crown of Naples. Pope Calixtus III. refused him the investiture, which however was granted to him by Pius II., the successor of Calixtus. His reign began well, but a conspiracy of the barons, who called in John of Anjou, who had some remote claim to the throne, threw the country into a civil war. Ferdinand, assisted by Scanderbeg, prince of Albania, gave battle to John near Troja in Apulia and defeated him completely, in the year 1462. After the battle he concluded a peace with the revolted barons upon conciliatory terms, but in a short time, breaking the treaty, he put to death two of them, an act which kept alive the jealousy and fears of the rest. In 1480 Mohammed II. sent an armament on the coast of Apulia, which took the town of Otranto and caused great alarm in all Italy. Ferdinand, however, quickly recalled his son Alfonso, duke of Calabria, who was then in Tuscany at the head of an army, and who retook Otranto. A fresh conspiracy of the barons broke out, encouraged by Pope Innocent VIII., but it was again repressed, and Ferdinand solemnly promised a general amnesty. But he kept his word no better than before, for having contrived, on the occasion of the marriage of his niece, to collect at Naples most of the leading barons, he arrested them all, and threw them into prison, where most of them were strangled. The whole of this tragedy, which was attended by circumstances of fearful treachery and cruelty, is eloquently related by Porzio in his work, *La Congiura dei Baroni contra il Rè Ferdinando I.* Ferdinand continued to reign for several years after this, feared and hated by his subjects, and himself in perpetual anxiety, which was increased by the advance of Charles VIII. of France, who was coming for the purpose of asserting his claims, derived from the Anjous, to the throne of Naples. In the midst of the alarm at the approaching storm, which he had not the means of averting, Ferdinand died in 1494, at the age of 71. He was succeeded by his son Alfonso, a gloomy and cruel prince, who, terrified at the approach of the French, abdicated in favour of his son Ferdinand, and retired to a convent in Sicily.

FERDINAND II. was very young when he found himself occupying a throne threatened by enemies from without and by disaffection from within. He endeavoured to rally his troops against the French, but being forsaken by all, he withdrew to Sicily with his uncle Frederic. The French

occupied Naples, where their conduct soon disgusted the Neapolitans, while the other states of Italy formed a league against them in the North. Ferdinand seized the opportunity to ask assistance from Ferdinand V. of Spain, who sent him his great Captain Gonzalo of Cordova with a body of troops, who soon reconquered the kingdom of Naples. Ferdinand returned in triumph to his capital, but did not long enjoy his prosperity; he died suddenly in 1496, at the age of 28 years, regretted by his subjects, who had formed great hopes of him from his amiable qualities and abilities. He was succeeded by his uncle Frederic, who was soon after treacherously deprived of his kingdom by his pretended ally, Ferdinand of Spain.

FERDINAND III. of Naples is the same as FERDINAND V. OF SPAIN.

FERDINAND IV. of Naples, afterwards styled Ferdinand I. of the United Kingdom of the Two Sicilies, born in January 1751, was the son of Don Carlos of Bourbon, king of the Two Sicilies, afterwards Charles III. of Spain. The life of Ferdinand is remarkable, not so much on account of his personal character, as from the uncommon length of his reign and its many vicissitudes being closely connected with all the great events of Europe during the last half century, as well as the singular good fortune which attended him to the end of his life with little or no exertion on his part. The education of Ferdinand was greatly neglected. He was little more than eight years of age when his father Charles, being called to the throne of Spain by the death of his brother Ferdinand VI., made over to him the kingdom of Naples and Sicily, appointing a council of regency, at the head of which he placed the Marquis Tanucci, an able minister, who however does not seem to have been very anxious about the instruction of his young sovereign. In April 1768, Ferdinand, being now of age, married Maria Carolina of Austria, daughter of Maria Theresa, a princess accomplished, clever, and ambitious, who in fact ruled under her husband's name till her death, assisted by the various ministers who succeeded each other at the helm of affairs, the king himself being generally passive, and his time being much engrossed by hunting, shooting, and other diversions. Yet Ferdinand was by no means deficient in good sense or natural penetration; he often saw things more clearly than those around him, which is manifest from many of his shrewd though blunt remarks which are still remembered at Naples; but his want of instruction, of which he was aware, and his dislike of application, prevented him from exerting or enforcing his own judgment. The first 30 years of his reign, those of the regency included, were for Naples years of peace and comparative happiness; many useful reforms were effected by his ministers, and especially by Tanucci, who continued at the head of affairs till 1777. A detailed account of these reforms, in the various departments of public education, ecclesiastical discipline, feudal jurisdictions, financial economy, and the administration of justice, is given by Colletta, in his able and impartial 'Storia del Reame di Napoli,' 1834, and also by Count Orloff in the 2nd volume of his 'Mémoires sur le Royaume de Naples.' Ferdinand was very popular, especially with the lower classes; and as he was the first king born at Naples for centuries past, they called him emphatically 'our king.'

Tanucci being dismissed in 1777 for having objected to the queen taking her seat in the council of state, Caracciolo and others followed for a short time, until John Acton, an Englishman, and a naval officer in the service of Leopold of Tuscany, was sent for to organize the Neapolitan navy and army, which had fallen into decline during a long season of peace. The advancement of Acton was extremely rapid; he was made general, then captain-general of the kingdom, and lastly premier, or rather sole minister (for the other ministers were merely his creatures), and in this office he remained for many years. His administration was neither so economical nor so wise as that of Tanucci. Things went on however quietly and smoothly for several years, yet a considerable degree of liberty of speech, and even of the press, prevailed at Naples, and the country was prosperous and the people contented until the breaking out of the French revolution, of which Naples, however remote, felt the shock. The queen being the sister of Marie Antoinette, was indignant at the treatment her relatives of France met with at the hands of the revolutionists; and as many young men at Naples, mostly belonging to the higher ranks of society, seemed to approve of the principles of the revolution, the court took alarm, and the men who had always been averse to reform and improvement seized the opportunity to regain the ascendancy. This was an epoch of a re-action in the internal politics of Naples. Arrests were made, and a giunta, or state tribunal, was formed to try the real or pretended conspirators, three of whom were sentenced to death, others to perpetual imprisonment, but the majority (against whom the judges, notwithstanding all the exertions of the attorney-general, Vanni, could find no evidence), were acquitted after four years' confinement.

The court of Naples had joined the first coalition against France in 1792, and had sent some troops to join the Austrians in the North of Italy, and others with a squadron to the expedition against Toulon. In 1796, however, alarmed by the successes of Bonaparte, a peace was concluded with the Directory by paying a few millions of francs. In 1798, the French having occupied the papal state, the court of Naples formed a secret alliance with Austria, England, and Russia, but, instead of waiting for the opening of the campaign in Lombardy, which was to take place in the following spring, the Neapolitan army, 60,000 strong, began hostilities in November, 1798, and marched upon Rome, which it occupied only for a few days, as the French generals, having collected their forces, attacked and routed several divisions of the Neapolitans, and cut off the communications between the rest; a general panic spread through the army; the king, who had accompanied it as far as Rome, fled back to Naples; Mack, who was his commander-in-chief, followed his example; and of the various corps that were left to themselves without any concerted plan or preparations in case of a reverse, some were dispersed or made prisoners, and others made good their retreat to their own frontiers, whither the French followed them closely. The greatest confusion prevailed at the court of Naples; the queen, beset by informers, fancied that the capital was full of conspirators, and determined to withdraw to Sicily. Ferdinand was easily persuaded to do the same, and the royal family left Naples on the 21st of December, 1798. The French meantime were approaching, and the populace, left without a government and excited by denunciations against the Jacobins, rose, murdered a number of persons, and for three days fought desperately against the advancing French in the streets of the capital. The events of Naples in 1799 form a romantic but most tragical episode in the history of the Continental war, and they have become the theme of numerous narratives. The best accounts are given by Colleta, already mentioned, by Cuoco, 'Saggio Storia sulla Rivoluzione di Napoli,' and in a work called 'Sketch of Popular Tumults,', London, 1837. The reverses of the French in Lombardy in the spring of 1799, obliged them to abandon Naples, leaving only a small garrison in it. The native republicans, or patriots as they were called, were few, and disliked by the lower classes. Cardinal Ruffo landed in Calabria from Sicily, and preached a sort of political and religious crusade against the French and their partisans, and the whole kingdom was re-conquered for Ferdinand in a short time. A dreadful re-action took place, in which thousands lost their lives, either murdered by the royalists, or condemned by the courts instituted to try all those who were accused of republicanism.

Ferdinand returned to Naples, and in 1801 he concluded, through the mediation of Russia, a treaty of peace with France. But the past events and the proscriptions that had taken place in his name had destroyed all confidence between the government and the more enlightened part of the nation. In 1805 the court of Naples committed a second political error, worse than that of 1798. While professing to be at peace with France, it entered secretly into the coalition against that power; and while Napoleon was defeating the Austrians on the Danube, Russian and English troops were landed at Naples to join the army of that kingdom for the avowed purpose of attacking the French in the north of Italy. The consequence was, that Napoleon, after his victory at Austerlitz, declared that 'the Bourbon dynasty had ceased to reign at Naples,' and he sent a force under Massena to occupy that kingdom. Ferdinand and his court withdrew to Sicily a second time, where, being protected by the English forces, they remained till 1815. A desultory but cruel warfare was carried on for several years in Calabria between the partisans of Ferdinand and those of Murat, whom Napoleon had made king of Naples, the details of which are vividly described by Botta, 'Storia d' Italia,' 24th book, towards the end. But even in Sicily the reign of Ferdinand did not run smooth. The court was

extravagant in its expenditure, the queen was as arbitrary as ever, and great jealousy existed between the Sicilians and the Neapolitan courtiers and emigrants. But Sicily had a parliament consisting of three orders, barons, clergy, and deputies of the towns, and the parliament would not sanction the levying of fresh taxes. The queen then ordered the imprisonment of five of the most influential barons. Meantime it was suspected that that princess, who had conceived a dislike against the English, whom she considered as a check upon her, entertained secret communications with Napoleon, who in 1810 had married her grand-niece, Maria Louisa. A conspiracy against the English was discovered at Messina. All these circumstances obliged the English government to interfere, and in January, 1812, Ferdinand resigned his authority into the hands of his eldest son, Francis. A parliament was assembled, which abolished feudality, and framed a new constitution upon a liberal basis. The queen's influence was now at an end, and after some fruitless intrigues she embarked in 1813 for Constantinople, from whence she went to Vienna, where she died in the following year. For an account of these important Sicilian transactions see Botta, and also a work styled *De la Sicile et de ses Rapports avec l'Angleterre à l'époque de la Constitution de* 1812, Paris, 1827. In 1814 Ferdinand resumed the reins of government, and opened in person the Sicilian parliament of that year. In 1815, after the defeat of Joachim Murat by the Austrians, Ferdinand was recalled to the throne of Naples, and in June of that year he returned to his old capital. In a well written proclamation to the Neapolitans he promised them peace, a complete forgetfulness of the past, impartial justice, and a steady administration. And now that he for the first time acted by himself, he kept his word. The government of Ferdinand at Naples from 1815 till 1820 was mild, impartial, and orderly. This is attested by Colletta, a liberal writer, b. viii. sec. 50, of his History. But in Sicily, having dissolved the parliament, he never convoked it afterwards. By a decree of December, 1816, he assumed the title of Ferdinand I., King of the United Kingdom of the Two Sicilies, declaring that Sicily and Naples formed no longer distinct states, but were both subject to the same system of government.

Meantime a secret society, called Carbonari, were spreading themselves fast through the kingdom, especially among the landed proprietors in the provinces, and consequently through the ranks of the provincial militia. The land-tax, which was more than 20 per cent. on the rent, made this class of people dissatisfied and ready for change. The origin of this society or sect, for it was religious as well as political, is somewhat obscure: it seems to have come from France into Italy, and was established in the kingdom of Naples under Murat, with his sanction; but was afterwards proscribed by him, and it then found favour with the court of Sicily. (*Memoirs of Secret Societies of the South of Italy*, London, 1821. See also Botta, book xxiv., and Colletta, book viii.) Colletta thus describes its tendency: 'The Carbonari spread among the minor orders of society, who, rallying round the principle of civil equality, move forward in a body pressing upon the higher orders; an impulse which in a virtuous and moral community tends to establish democratic institutions, but which in our own corrupt and profligate state of society tends only to a change of matters under the forms and the language of democracy.

On the 2nd of July, 1820, a military revolt, led by two subalterns, broke out in a regiment of cavalry stationed near Naples; other troops joined in it, and the Carbonari of the capital and provinces openly espoused its cause, demanding a representative constitution for the kingdom. Ferdinand, pressed by his ministers, promised to establish a constitution in a given time; but the Carbonari would not wait, saying it was better to adopt one already made, namely, that of the Cortes of Spain, and thus the Spanish constitution was proclaimed, and a parliament was convoked at Naples. Meantime the Sicilians, ever jealous of their nationality, demanded a separate parliament for themselves and a repeal of the union of the two kingdoms, which the parliament at Naples refusing, a revolt broke out at Palermo, which was put down after much bloodshed. Soon after, the sovereigns of Austria, Russia, and Prussia, assembled at Troppau, wrote to King Ferdinand, inviting him to a conference at Laybach, in Carinthia, without which they stated that they could not acknowledge the new system of government established at Naples. Ferdinand, after some demur, obtained leave of the parliament to proceed to the congress in December, 1820, leaving his son Francis as his vicegerent at Naples. In February, 1821, Ferdinand, by a letter written from Laybach, signified to his son that the allied sovereigns were determined not to acknowledge the actual constitutional government as established at Naples, deeming it incompatible with the peace of that country and the security of the neighbouring states; but that they wished Ferdinand himself, assisted by the wisest and most able among his subjects, to give to his kingdom institutions calculated to secure peace and prosperity to the country. Soon afterwards the Austrian army passed the Po, moving on towards Naples. The parliament of Naples determined upon resistance, but at the first encounter, near Rieti, a Neapolitan division was defeated, and the rest of the army being alarmed at the thought of fighting against the will of their own king, disbanded, and the Austrians entered Naples without any further opposition at the end of March, 1821. Ferdinand soon afterwards returned to his capital on what may be styled his third restoration. The leading constitutionalists were allowed to emigrate; but of those who remained some were tried and sent to the Presidii. The government again became absolute, but not so lenient or liberal as it was before 1820. After reigning four years longer, Ferdinand died suddenly on the morning of the 4th of January, 1825, aged seventy-six, having been king sixty-five years. He was succeeded by his son, Francis I.

FERDINAND, or FERNANDO I., styled the Great, the son of Sancho, called Mayor, king of Navarra and Castile, succeeded his father in 1035, and having defeated and killed Veremund, king of Leon, in 1038, succeeded him as king of Leon and of Asturias. Navarra became the appanage of Ferdinand's brother Garcia. Ferdinand, called the Great, made war against the Moors, whom he drove away from the northern part of Portugal as far as the Mondego. He died in 1065, leaving three sons, Sanctius, to whom he gave Castile; Alfonso, who had Leon; and Garcia, who retained Gallicia.

FERDINAND II., second son of Alonso VIII. of Castile and Leon, succeeded his father in the latter kingdom only in 1157. He was engaged in wars with Alfonso Henrique, king of Portugal, and also with his own nephew, Alonso of Castile. He died in 1187.

FERDINAND III., called the Saint, son of Alonso IX., king of Leon and of Berengaria of Castile, inherited both crowns after the death of his parents. Ferdinand was successful in his wars against the Moors beyond any of his predecessors: he took from them Badajoz and Merida in 1230, Cordova in 1236, and Jaen, Seville, and Murcia in 1243. He was making preparations for carrying the war into Africa when he died, in 1252. Ferdinand collected the laws of his predecessors into a code; he established the council of Castile; he cleared his states from robbers, and checked the arbitrary acts of the nobles. He was one of the most illustrious sovereigns of the old Spanish monarchy. His son Alonso X., called 'the Wise,' succeeded him on the throne.

FERDINAND IV. succeeded his father, Sancho IV., in 1295, while yet a minor. His reign was engrossed chiefly by wars with the Moors; he died in 1312, and was succeeded by his son Alonso XI.

FERDINAND V. of Castile and II. of Aragon, son of John II. of Aragon, married in 1469 Isabella, daughter of John II. of Castile, and heiress to that crown, by whom he had several daughters, one of whom married Emmanuel, king of Portugal; another, Catherine, was married to Henry VIII. of England, and the other, Joanna, married Philip, archduke of Austria, son of the emperor Maximilian I. Ferdinand succeeded to the crowns of Aragon and of Sicily by the death of his father, and his wife Isabella had already succeeded in her own right, and with the sanction of the Cortes, to the throne of Castile by the death of her brother, Henry IV., in 1472. Thus were the two great divisions of Spain united, though the two kingdoms remained under separate administrations, Castile was still governed in the name of the queen until the death of Isabella in 1504, followed by that of the archduke Philip in 1506, when Ferdinand, owing to the insanity of his daughter Joanna, assumed the government of Castile, which he retained till his death, when his grandson, Charles V., succeeded to the whole splendid inheritance.

Ferdinand took from the Moors the kingdom of Gra-

nada, their last possession in Spain, in 1492, after a war of several years; at the same time Columbus was discovering for him the new world, where the Spaniards soon after made immense conquests. Ferdinand's general, Gonzalo of Cordova, conquered for him the kingdom of Naples, partly by force, and partly by treachery. By similar means Ferdinand conquered Navarra, which he added to his other dominions. He was the most powerful monarch of his time, and was also the cleverest; but his abilities were disgraced by a total want of faith, and a recklessness of principle of which he made no scruple of boasting. He was styled the Catholic, a title which the kings of Spain have continued to assume ever since, in consequence of his having cleared the soil of Spain of the Mohammedans. He was also called the Prudent, and the Wise. He was ably assisted by his minister, Ximenes [CISNEROS], who emancipated the crown from the power of the feudal nobles by raising troops at the expense of the state, and by favouring the privileges of the municipal towns. Ferdinand established the Inquisition in Spain, which fearful tribunal continued till 1820, when it was finally abolished. Acting from the same intolerant principle he drove away the Jews from Spain; but he also established a severe system of police throughout his dominions by means of the association called the Santa Hermandad, which did summary justice upon all offenders without distinction of ranks. He also forbade any papal bull to be promulgated without the previous sanction of the royal council. He may be considered as the restorer, if not the founder, of the Spanish monarchy. Ferdinand died in January, 1516, at sixty-three years of age.

FERDINAND VI., eldest son of Philip V. of Bourbon, king of Spain, succeeded his father in 1746. He made several useful reforms in the administration, and gave encouragement to commerce and manufactures. He had the character of a good and wise prince, willing to administer impartial justice, and willing to redress the grievances of his subjects. He died without issue in August, 1759, and was succeeded by his brother Don Carlos, king of the Two Sicilies, who assumed the title of Charles III. of Spain, and continued the same laudable system as his predecessor.

FERDINAND VII., eldest son of Charles IV., king of Spain, and of Maria Louisa of Parma, was born on the 14th of October, 1784. When six years of age, he was proclaimed prince of Asturias. At that time Godoy, afterwards called the Prince of Peace, was the favourite minister and ruler at the Spanish court. Both he and the queen kept young Ferdinand, who was of a sickly constitution, in a state of thraldom and seclusion little suited to the heir apparent of the throne. He had however some well-informed preceptors; among others the canon Escoiquiz, who figured afterwards in the political events of his reign. In 1802 Ferdinand married his first cousin, Maria Antonietta, daughter of Ferdinand IV., king of the Two Sicilies, a princess of a superior mind, who endeavoured to restore her husband to his proper sphere and influence at court: in attempting which she drew upon herself the dislike of the queen and of the favourite, and from that time both she and her husband were kept in a state of retirement and humiliation. She died suddenly in May, 1806, under suspicious circumstances, and left no issue.

In the mean time the administration of Spain was in a wretched state; every thing was done through bribery or favour; the monarchy was sinking lower and lower in the estimation of Europe, having become a mere dependent of France, and the people were highly dissatisfied. Some friends of Ferdinand, and among others his preceptor Escoiquiz, formed a plan for overthrowing the favourite Godoy. Being in want of powerful support, they unwarily advised Ferdinand to address himself to the Emperor Napoleon, to whom the prince wrote a letter, dated 11th of October, 1807, in which he complained of Godoy's influence and the state of thraldom in which both the king his father and himself were kept, and expressed a desire to form a connexion with a princess of Napoleon's family, and to place himself under his protection. A memorial was at the same time penned by Escoiquiz, and copied by Ferdinand with his own hand, pointing out in vivid language the mal-administration of the kingdom, and asking, as the first remedy, the dismissal of the favourite. Ferdinand was to have read this memorial to the king his father, but Godoy being apprised of the plot, hastened to Charles, and told him that his son was conspiring both against his crown and his life. Upon this Ferdinand was arrested, his papers were seized, and after some days of close confinement he was frightened into an acknowledgment of what he really was not guilty of—a conspiracy to dethrone his own father. This scandalous affair caused great excitement in the country, and the people in general, who disliked Godoy, took the part of the young prince, who from his infancy had been the victim of court intrigues. Meanwhile French troops had entered Spain under the pretence of marching against Portugal—had taken possession by surprise of several fortresses, and Napoleon's further intentions becoming more alarming, the court decided upon abandoning Spain and retiring to Mexico. The 17th of March, 1808, was fixed for the departure, when a revolt broke out among the guards at Aranjuez, and Godoy was in danger of his life; but Ferdinand himself came to rescue him from the hands of the mutineers, saying that he would answer for his appearance before the proper court. King Charles being alarmed for his own safety, and perceiving the popularity of his son, abdicated on the 19th of March in favour of Ferdinand, who assumed the title of king of Spain and the Indies. But this did not suit Napoleon, who contrived under specious pretexts to draw both father and son to Bayonne, and there obliged them both to resign in his favour. Ferdinand and his brother Don Carlos were sent to Talleyrand's country residence at Valençay, where they were treated with outward marks of respect, but kept under a strict watch. There Ferdinand remained passive and resigned till the end of 1813, when the reverses of the French both in Spain and in Germany induced Napoleon to restore Ferdinand to the throne of Spain, on condition that he should send the English out of the peninsula, who were, as Napoleon said, spreading anarchy and jacobinism in the country. A treaty to that effect was signed at Valençay between the two parties, but the Cortes of Madrid refused to ratify it, and wrote to Ferdinand that they would receive him in his capital as their lawful king, provided he would sign the constitution which had been proclaimed at Cadiz in 1812 by the representatives of the nation. [CORTES, and references therein.] Ferdinand set off from Valençay in March, 1814, and it was only on the road that he read for the first time a copy of the new constitution, having been kept in ignorance till then of the proceedings of the Cortes, except what he had read in the garbled accounts of the French newspapers. On arriving at the frontiers of Spain, instead of proceeding direct to Madrid, he went to Zaragoza, and thence to Valencia, where he was surrounded by a host of people, military and civilians, churchmen and laymen, who were hostile to the constitution, and who advised him to reign, as his fathers had done before him, an absolute king. The lower classes, excited by the clergy, and especially by the friars, were loud in their denunciations of the constitution, which they called heretical, and Ferdinand easily persuading himself that the constitution was unpopular, determined not to sanction it. At Valencia he appointed a ministry from among the serviles, or absolutists; and on the 4th of May, 1814, he issued a decree annulling the constitution and all the enactments of the Cortes made in his absence. Soon afterwards he made his entrance into Madrid among the acclamations of the populace and of the absolutists, or clergy party; an event which was speedily followed by a violent proscription of the constitutionalists, or liberals, as they were styled, including the members of the Cortes. As the British ambassador had obtained from Ferdinand at Valencia a promise that the punishment of death should not be inflicted for past political conduct, the courts appointed to try the leading constitutionalists resorted to every kind of subterfuge in order to find them guilty of some imprudent demonstration or expression since the king's return, and sentences of imprisonment, exile, banishment to the presidios in Africa, and confiscation, were freely awarded. The military insurrections of Porlier, Lacy, and others, came to add fresh fuel to the spirit of persecution. All the abuses of the old administrative and judicial system now re-appeared; the finances were in a wretched state, the American colonies were in open revolt, and Ferdinand was either kept in ignorance of the true state of things, or his natural indecision of character prevented him from altering his policy. He was overawed by the clergy and absolutist party, who, at that time, seemed to have on their side the great mass of the population, and he feared and hated the liberals, whom he looked upon as the enemies of his throne.

On the 1st of January, 1820, part of the troops stationed

in the Isle of Leon, near Cadiz, under colonels Quiroga and Riego, proclaimed the constitution of 1812; the example was followed by other garrisons; the Ministers at Madrid hesitated, and Ferdinand, on the 8th of March of that year, swore his adherence to the constitution. The Cortes were assembled, and the deputies and other liberals, who had been exiled or imprisoned, re-appeared on the political stage. The events of the following three years are matters of contemporary history, upon which it is difficult as yet to pronounce a final judgment. Errors were committed by all parties. At one time Ferdinand appeared reconciled to the constitutional system, but now and then some fresh insult or other act of violence of the more zealous liberals came to rouse his old fears and antipathies; whilst, on the other side, the partisans of absolutism, who still lingered near the king's person, kept alive by their intrigues the mistrust even of the moderate constitutionalists. Of this period of Ferdinand's reign there is a pretty accurate sketch in a work written by a Spanish emigrant at Paris, styled '*Revolution d'Espagne, Examen Critique*, 8vo., 1836.

At the beginning of 1823 Louis XVIII. declared to the French chambers that he was going to send his nephew, the duke of Angoulême, with an army of 100,000 Frenchmen into Spain to deliver Ferdinand VII. from the slavery in which he was kept by a factious party, and to restore him to his freedom of action. The English ministry protested against this interference, and the Cortes of Spain, on their side, rejected the mediation of the northern courts, who, to prevent the entrance of the French, required certain modifications in the constitution of 1812. The Cortes, on the 20th March, removed to Seville, where the king was induced to follow them. On the 7th April the French entered Spain, with little or no opposition, and on the 23rd they entered Madrid, where they were received with acclamations by the clergy and the lower classes, while the grandees or high nobility presented a congratulatory address to the duke of Angoulême. The Cortes, not judging themselves safe at Seville, removed to Cadiz, and, as Ferdinand refused to quit Seville, they passed a resolution, after a stormy debate on the 11th June, declaring the king in a state of incapacity, and appointing a regency *pro tempore*. Ferdinand was then compelled to set off with his family on the evening of the 12th, under a strong escort, for Cadiz, where he arrived on the 15th. In the following September the French besieged Cadiz, and after some negotiations Ferdinand was allowed by the Cortes to repair to the French camp to treat with the Duke of Angoulême. Before leaving Cadiz Ferdinand published a proclamation on the 30th September, in which he promised a general amnesty for the past; he acknowledged all the debts and obligations contracted by the constitutional government, and 'declared of his own free and spontaneous will that if it should be found necessary to make alterations in the actual political institutions, he would adopt a system of government which should guarantee the security of persons and property and the civil liberty of the Spaniards.' None of these solemn promises were kept. The liberals were persecuted worse than before, the debts contracted under the Cortes were disavowed, and the old system of absolutism with all its maladministrations was resumed. The sequel is well known. Ferdinand continued to govern, at least nominally, checked on one side by fear of the liberals, and on the other by mistrust of the more violent absolutists, or apostolical party as it was called, who found Ferdinand too moderate for them, and who would have re-established the Inquisition, and ruled Spain by terror. In his latter years Ferdinand seemed to take little or no interest in public affairs, leaving things to go on as they could. Having lost his third wife, who was a Saxon princess, and having yet no children, he married in November, 1829, Maria Christina, daughter of Francis, king of the Two Sicilies, and his own niece by her mother's side. By her he had two daughters—Maria Isabella, now queen of Spain, born 10th October, 1830, and Maria Louisa Ferdinanda, born 1832. Ferdinand died on the 29th September, 1833, after being long in a bad state of health, at the age of 49 years. He was buried with great pomp in the royal vaults under the chapel of the Escurial.

Accounts more or less accurate of the various periods of his reign may be gathered from the numerous contemporary public documents and journals, and also from the following works:—*Memoirs of Ferdinand VII. king of Spain, translated from the Spanish original MS.* by M. J. Quin, London, 1824; Toreno, *Historia del Levantamiento, Guerra y Revolucion de España*: Inglis's *Spain in 1830*; and a very interesting article *on Spanish Affairs* in No. 1 of Cochrane's *Foreign Quarterly Review*, March, 1835, from which something like a correct estimate of Ferdinand's character may be formed.

FERDUSI. [FIRDOUSI.]

FERGUSON, JAMES, was born in 1710, at a short distance from Keith, a village in Banffshire. His father, who was a day-labourer, taught him to read and write, and sent him to school for three months at Keith.

When only seven or eight years old, having seen his father use a beam as a lever, with a prop for a fulcrum, in order to raise the roof of their cottage, which had partly fallen in, his curiosity was so much excited by the ease with which what appeared to him so stupendous an effect was accomplished, that he thought about it, and made trials, and constructed models, and drew diagrams, till he became acquainted with the chief properties of the lever, not only in its simple application, but as modified by the wheel and axle. The taste for practical mechanics thus formed continued to distinguish him through life, and, together with an equally decided taste for astronomy, conducted him in his later years to distinction and independence.

His astronomical pursuits commenced soon afterwards. His father sent him to a neighbouring farmer, who employed him in watching his sheep. While thus occupied, he amused himself at night in studying the stars, and during the day in making models of mills, spinning-wheels, and similar things. When a little older, he entered into the service of another farmer, who treated him with great kindness, and encouraged and assisted him in his astronomical studies. 'I used,' he says, 'to stretch a thread with small beads on it at arm's length between my eye and the stars, sliding the beads upon it till they hid such and such stars from my eye, in order to take their apparent distances from one another; and then laying the thread down on a paper, I marked the stars thereon by the beads.' 'My master,' he adds, 'that I might make fair copies in the day-time of what I had done in the night, often worked for me himself.' Mr. Gilchrist, the minister of Keith, having seen his drawings, gave him a map of the earth to copy, and furnished him with compasses, ruler, pens, ink, and paper.

At the house of Mr. Gilchrist he met Mr. Grant of Achoynaney, with whom, at the termination of his engagement with his present master, he went to reside, being then in his twentieth year. He had learnt vulgar arithmetic from books, and Mr. Grant's butler, Mr. Cantley, taught him decimal arithmetic and the elements of algebra, and was about to commence instructing him in geometry when he left the employment of that gentleman.

Ferguson soon afterwards entered into the service of a miller in the neighbourhood, where he was overworked, and scarcely supplied with food enough for subsistence. After remaining a year in this situation, he was engaged by Dr. Young, who was a farmer as well as a physician, and who promised to instruct him in medicine, but broke his promise, and treated him with so much harshness, that, though his engagement was for half a year, he left at the quarter, and forfeited the wages which were due to him. A severe hurt of the arm and hand, which he had got in the doctor's service, confined him to his bed for two months after his return home. During this time he amused himself with constructing a wooden clock. He afterwards made a wooden watch with a whalebone spring; and his talents having been turned in this direction, he began to earn a little money in the neighbourhood by cleaning and mending clocks.

He was about this time invited to reside with Sir James Dunbar of Durn, and, at the suggestion of Lady Dipple, Sir James's sister, began to draw patterns for ladies' dresses. He says, 'I was sent for by other ladies in the country, and began to think myself growing rich by the money I got by such drawings; out of which I had the pleasure of occasionally supplying the wants of my poor father.' His studies in astronomy however were not neglected, and he still continued to use his thread and beads.

Besides drawing patterns, he copied pictures and prints with pen and ink; and having left the residence of Sir James Dunbar for that of Mr. Baird of Auchmeddan, Lady Dipple's son-in-law, he drew a portrait of the gentleman, which was much admired, and now be Silces and likenesses from the life in Indian ink: the mountain to his patrons to be so excellent, that the the highest Edinburgh with the intention of havi is distinguished Vo ock, caverns, and

instructed in drawing, but a premium having been unexpectedly demanded, he boldly commenced the practice of his art at once. The Marchioness of Douglas having assisted him with her patronage, he succeeded so well, that he obtained money enough not only to defray his own expenses, but to contribute largely to the support of his aged parents.

Though he continued to follow this profession for about twenty-six years, he seems never to have given his mind to it; and indeed, after having been two years in Edinburgh, he returned to the country with a supply of drugs with the intention of practising medicine, but soon found himself to be totally unqualified for his new occupation. He then went to Inverness, where he remained about three months. While there he drew an Astronomical Rotula, for exhibiting the eclipses of the sun and moon, which he transmitted to Professor Maclaurin at Edinburgh, who was highly pleased with it. He now returned to Edinburgh, and the Professor had the Rotula engraved, and it ran through several impressions, till, by the change of the style in 1753, it became useless. While at Edinburgh he made a wooden orrery, and delivered a lecture on it before the mathematical class.

In 1743 he resolved to go to London, where he continued his profession of drawing portraits, but devoted his leisure to astronomical pursuits.

In 1747 he published his first work, 'A Dissertation on the Phenomena of the Harvest Moon,' having been previously introduced at one of the sittings of the Royal Society by Mr. Folkes the president.

In 1748 he read lectures on the eclipse of the sun which happened in that year. From this period he began, under the patronage of the prince of Wales, afterwards George III., to deliver lectures on astronomy and mechanics: they were numerously and fashionably attended, and he now relinquished his former profession altogether. From this time to the end of his life he continued his lectures, and wrote several works on astronomy and mechanics.

Soon after the accession of Geo. III. a pension of 50*l.* a year was granted him out of the privy purse. In 1763 he was elected a Fellow of the Royal Society, and in 1770 was chosen a member of the American Philosophical Society.

He died in 1776, aged 66, leaving an only son, to whom he bequeathed a considerable sum acquired by his lectures and his writings.

Ferguson has contributed more than perhaps any other man in this country to the extension of physical science among all classes of society, but especially among that largest class whose circumstances preclude them from a regular course of scientific instruction. Perspicuity in the selection and arrangement of his facts and in the display of the truths deduced from them was his characteristic both as a lecturer and a writer.

The following are his principal works: 'Astronomy explained upon Sir Isaac Newton's Principles, and made easy to those who have not studied Mathematics,' 4to. 1756. There have been many editions of th , work; one by Dr. Brewster, 2 vols. 8vo. 1811, containing the new discoveries since the time of Ferguson. 'Lectures on Subjects in Mechanics, Hydrostatics, Pneumatics, and Optics, with the Use of the Globes, the Art of Dialling, and the Calculation of the Mean Times of New and Full Moons and Eclipses,' 8vo. 1760; 4to. 1764. An edition of this work by Dr. Brewster was published in 1805, and another in 1806. 'An Easy Introduction to Astronomy for Young Gentlemen and Ladies,' 1769. 'Introduction to Electricity,' 8vo. 1770. 'The Art of Drawing in Perspective made easy to those who have no previous knowledge of Mathematics,' 8vo. 1775: this was his last work. Besides other works not mentioned here, he contributed several papers to the Philosophical Transactions.

(*Life* by himself, prefixed to his 'Select Mechanical Exercises;' Nichols's *Anecdotes*; *Pursuit of Knowledge under Difficulties*, vol. i., in 'Library of Entertaining Knowledge.')

FERGUSON, ADAM, born in 1724, was the son of a parish minister in Perthshire. He studied at St. Andrews and at Edinburgh. On being ordained, he was appointed chaplain to the 42nd, a Highland regiment, in which he remained till 1757, when he retired and was appointed keeper of the advocates' library of Edinburgh. In 1759 [illegible] professor of natural philosophy in the college and in 1764 he was appointed to the chair of [illegible]ophy, a branch of science to which he had [illegible] applied himself. In 1767 he published [illegible] History of Civil Society,' a work which was well received, and which procured him the notice of public men. It was reprinted several times, and translated into French, German, and other languages. In 1774 he accompanied the young Earl of Chesterfield on his travels, but remained with him only a twelvemonth. In 1776 he wrote 'Remarks on a Pamphlet of Dr. Price, entitled Observations on the Nature of Civil Liberty.' In 1778 he was appointed secretary to the commissioners who were sent to America in order to try to effect a reconciliation with the mother country, an office in which Ferguson took a clearer view of the state of the question and of the temper of the American people, than was common at that time with Englishmen. On his return in 1779 he resumed the duties of his professorship, and in 1783 he published his 'History of the Progress and the Termination of the Roman Republic,' 3 vols. 4to. This work, which has been reprinted several times, and by which Ferguson is most generally known, is not so much a regular narrative of the events of Roman history, as a commentary on that history; its object is to elucidate the progress and changes of the internal policy of the Roman commonwealth, the successive conditions of its social state, as well as the progress of the military system of the Romans, and the varied but studied course of their external policy towards foreign nations. He carries his work down to the end of the reign of Tiberius, when all remains of the old institutions may be said to have become effaced. Ferguson's work forms therefore a kind of introduction to that of Gibbon on the decline and fall of the empire. Ferguson and his contemporary, the French Abbé Auger, were foremost among those who, previous to Niebuhr, investigated the internal working of the institutions of the Roman republic. [AUGER.] In 1784 Ferguson resigned his professorship on account of ill health, and was succeeded by Dugald Stewart. In 1792 he published 'Principles of Moral and Political Science, being chiefly a retrospect of lectures on ethics and politics, delivered in the College of Edinburgh,' 2 vols. 4to. In this work the author takes a comprehensive review of the various systems of ethics antient and modern, especially with respect to moral approbation, public security, and individual happiness. Another work of Dr. Ferguson's on the same subject, though a more elementary one, the 'Institutes of Moral Philosophy,' which he first published in 1769, has been often reprinted and translated into foreign languages, and has also been adopted as a text-book in some foreign universities. Ferguson died at St. Andrews in February, 1816, being above 90 years of age. He had been on terms of friendship with Hume, Robertson, Adam Smith, Dugald Stewart, Playfair, and other distinguished contemporaries. His mind was independent, and his frankness and honest adherence to his opinions are said to have stood in the way of his advancement.

FERGUSON, or FERGUSSON, ROBERT, was born at Edinburgh about the year 1750, and educated at the University of St. Andrew's, where he received some encouragement from one of the professors named Wilkie, who employed him to transcribe his lectures. An anonymous biographer (Life prefixed to Ferguson's Poems, edition of 1807) has employed considerable research in discovering certain freaks of a kind neither ludicrous nor in good taste, in which he appears to have indulged during his residence at St. Andrew's; one of these was near being the cause of his expulsion; but the sentence was recalled, and he remained as it appears for four years, during which time he subsisted on a bursary or exhibition founded by a person of his own name. On leaving St. Andrew's, he paid a visit to an uncle from whom he had expectations of employment, but after a few months left his house under circumstances of which his anonymous biographer gives a very unsatisfactory account. During the remainder of his life he was employed in the office of the commissary-clerk of Edinburgh, with the exception of a few months spent in that of the sheriff-clerk; and was a constant contributor to Ruddiman's 'Weekly Magazine,' from which his poems were afterwards collected. The local celebrity which these productions obtained for him gave him so frequent opportunities of convivial and other excess as to ruin his health, and terminate his life at the early age of twenty-four years. His last days were passed in a mad-house, his debauchery having ended in repentance which took the form of melancholy, and ultimately that of insanity.

Ferguson's poems are written partly in English and partly in Lowland Scotch. Those in Lowland Scotch have been admired by persons conversant with the idiom in which they

are written; but to an English ear they want the charm which makes Burns not the less sweet because he is sometimes not intelligible. There is a coarseness and clumsiness about Ferguson's, which render it wonderful how their author could have ever succeeded in gaining reputation as a poet. In praise of his English verses, a little more may be said; but we suspect that the similarity of his life to that of Chatterton created an interest about him to which most, if not all of his celebrity is owing.

His life has been written by Irving (Glasgow, 1799: reprinted in 1805), and by an anonymous author who dedicates his sketch to James Grahame, esq. This latter production contains more specimens of bombast and bad taste than are usually found in the space of eighty pages, and serves by its tone of panegyric to reproduce exactly those prejudices which it was intended to repress.

(Chalmers's *Biogr. Dict.*; and *Biographie Universelle*, vol. xiv.)

FERGUSONITE, a crystallized mineral, which is principally a columbate of yttria. It has been found only in Greenland, near Cape Farewell, imbedded in quartz.

Primary form a square prism. Colour brownish-black. Opaque, except in the splinters. Lustre slightly metallic. Specific gravity 5·838. Hardness 5·5, 6·0. Streak pale brown. Fracture conchoidal. Before the blow-pipe becomes of a greenish-yellow, and does not fuse, but with a phosphate it dissolves completely. According to Hartwall, this mineral consists of

Oxide of columbium	47·75
Yttria	41·91
Zirconia	3·02
Oxide of cerium	4·68
" tin	1·00
" uranium	0·95
" iron	0·34
	99·65

FERISHTA (Mohammed Kasim), a celebrated Persian historian, was born at Astrabad, on the border of the Caspian Sea, in A. D. 1570. His father, whose name was Gholam Ali Hindoo Shah, and who appears to have been a learned man, left his native country when Ferishta was very young and travelled into India. He finally settled at Ahmudnugger, in the Deccan, during the reign of Murtuza Nizam Shah, and was appointed to instruct Mîran Hossein, the son of Murtuza, in the Persian language, but he died soon after this appointment. Mîran Hossein however patronized his son Ferishta, and through his influence the historian was advanced to high honours in the court. When Murtuza was assassinated, Ferishta, who was then only seventeen years of age, was captain of the royal guard.

In the troubles following the death of Murtuza, Ferishta left Ahmudnugger, A. D. 1589 (see the preface to his history), and went to Bejapore, where he was kindly received by the regent and minister, Dilawur Khan, who introduced him to Ibrahim Adil Shah II., the reigning monarch. In this court he spent the remainder of his life in high honour, engaged sometimes in military expeditions, as we learn from his own history, and devoting his leisure time to the composition of his great work. He died, in all probability, soon after A. D. 1611, at the age of forty-one. He makes mention in his history of the English and Portuguese factories at Surat, A. D. 1611.

The preceding account has been chiefly taken from the English translation of Ferishta, by Colonel Briggs, which was published in London, 1829, in 4 vols., 8vo. Portions of the history had been previously translated. Colonel Dow published a translation of the first two books in his 'History of Hindostan,' 2 vols., 4to., London, 1768, which is not considered to be very accurately done. A much better translation of the third book was given by Mr. Jonathan Scott in his 'History of the Deccan,' 2 vols., 4to., 1794. Mr. Stewart, in his 'Descriptive Catalogue of the Library of the late Tippoo Sultan of Mysore,' gives an account of the contents of the history, p. 12; and also a translation of part of the tenth book, accompanied with the original Persian, pp. 259—267.

The history of Ferishta is divided into twelve books, with an introduction, which gives a brief and imperfect account of Hindoo history before the time of the Mohammedans, and also a short account of the conquests of the Arabs in their progress from Arabia to Hindostan. The first book contains an account of the kings of Ghizni and Lahore, A. D. 977—1186. Here the detailed portion of his history begins. 2nd, The kings of Delhi, A. D. 1205 to the death of Akber, 1605; 3rd, The kings of the Deccan, A. D. 1347—1596; 4th, The kings of Guzerat; 5th, The kings of Malwa; 6th, The kings of Kandeish; 7th, The kings of Bengal and Behar; 8th, The kings of Multan; 9th, The rulers of Sind; 10th, The kings of Cashmir; 11th, An Account of Malabar; 12th, An Account of the European Settlers in Hindostan. At the conclusion of the work, Ferishta gives a short account of the geography, climate, and other physical circumstances of Hindostan.

Ferishta is certainly one of the most trustworthy of oriental historians. He seems to have taken great pains in consulting authorities. At the close of his preface he gives a list of thirty-five historians to whom he refers, and Colonel Briggs mentions the names of twenty more who are quoted in the course of the work. 'What is really remarkable in this writer,' says Colonel Dow, 'is, that he seems as much divested of religious prejudices as he is of political flattery or fear. He never passes a good action without conferring upon it its due reward of praise, nor a bad one without stigmatizing it with infamy.'

FERMANAGH, an inland county of the province of Ulster, in Ireland: bounded on the north west, north, and north-east by the counties of Donegal and Tyrone; on the east by the county of Monaghan, and on the south and south-west by the counties of Cavan and Leitrim. The greatest length from the boundary of Donegal towards Ballyshannon on the north-west, to Shankill Loch, on the borders of Monaghan, on the south-east, is 45 statute miles; the breadth, from Cuilcagh mountain, on the borders of Cavan, on the south-south-west, to Tappaghan mountain, on the borders of Tyrone, on the north-north-east, is 29 statute miles. The area, according to the Ordnance Survey map, consists of—

	A.	R.	P.
Land	409,783	1	12
Water	46,748	1	2
Total	456,531	2	14

Of this extent of water 36,348 acres and 21 perches are included in the upper and lower lakes of Loch Erne, which lie almost wholly within this county. [ERNE, LOUGH.] The gross population of Fermanagh in 1831 was 149,763.

Fermanagh is divided into two nearly equal portions by the line of Loch Erne, which passes through it diagonally. The portion lying south of the upper or western sheet of Loch Erne contains a large tract of waste and mountain, of the same character with the extensive highland districts of Leitrim and Cavan, on which it borders. This tract is bounded on the south by the lakes of Loch Melvin and Upper and Lower Loch Macnean; the waters of the first of which flow westward to the Atlantic, and of the two latter, eastward by the Arney river into Upper Loch Erne. The chief elevations of this tract on the north are, beginning from the west, Glennalong, 793 feet; Tiranagher, 875 feet; Bolusty, 1064 feet; Shean North, 1175 feet; Shean East, 1030 feet; and Blackslee, 1026 feet; which overhang the shore of Upper Loch Erne in a continuous range. More central are Drumbad, 1009 feet; Knockmore, 919 feet; Glenkeel, 1223 feet; and Belmore, 1312 feet; and on the south Slapragh, 846 feet; Ora More, 854 feet; and Aghamore, 1249 feet. The whole of this district abounds with small lakes, and is traversed by numerous ridges running generally in a direction from east to west. It is particularly remarkable for the number of cavities and subterranean channels which occur throughout the limestone and sandstone rocks of which it is composed. The Roogagh river, which brings down the waters of several small lakes and tributary streams to Loch Melvin, is absorbed in the rock, and emerges, after running a distance of about thirty perches underground. In like manner, several brooks running into Loch Erne from the range of Shean North and Blackslee, dip underground in their course. A natural bridge of rock crosses a stream which forms part of the boundary of the district on the south; and throughout the central parts caves and deep holes in the rock are of very frequent occurrence. On the east this rough tract slopes down to a well-cultivated district extending from Enniskillen along the neck of Loch Erne and up the valley of the Silees and Arney rivers. South of the latter river rises the mountain of Cuilcagh to a height of 2188 feet, being the highest ground in the county. This neighbourhood is distinguished by the same characteristics—holes in the rock, caverns, and

natural arches—which mark the more extensive mountain district. Three streams, descending from Cuilcagh, sink into different cavities of the rock, and after flowing nearly a mile each underground, re-issue in a single river, called the Claddagh, a feeder of the Arney. At the foot of Cuilcagh is situated Florence Court, a noble seat of the earl of Enniskillen; and generally throughout the tract from Loch Macnean to Enniskillen, and thence along the left bank of the lake, the seats of resident proprietors are numerous and highly respectable. The remainder of that part of the county which lies south of Loch Erne is low, and cultivated.

The district to the north of the Upper Lake is not diversified by many eminences: the chief are Glenvannan, 730 feet; and Tappaghan, 1110 feet. Towards Enniskillen there are numerous and well-improved seats of proprietors; and close to the town is Castle Coole, the residence of the earl of Belmore, which is generally considered the most splendid residence in the modern style in Ireland. Tossid mountain, 909 feet in height, rises north-east of Enniskillen, and from its situation in a comparatively flat district, commands a very extensive and picturesque prospect. From Enniskillen to Upper Loch Erne the winding river is occupied on each side by demesnes and other improved lands; the upper lake, containing an immense number of wooded islands, is highly beautiful; the domesnes of Bellisle and Crum Castle terminate it at each extremity. The remainder of the county north of the upper lake is chiefly arable, and has a numerous and industrious population. The only towns of any consequence in the county besides Enniskillen and Irvinestown lie in this district, viz. Newtown Butler, Lisnaskea, Maguire's Bridge, Lisbellaw, and Tempo.

The rivers of Fermanagh are small. From the mountainous district on the south-west, the Silees and Arney run into Loch Erne: the Cladagh or Swanlinbar river flowing south-east of Cuilcagh has a like termination. The Woodford, which separates Fermanagh from a part of Cavan, is the largest river which discharges itself into Loch Erne within the bounds of this county. The Drumany or Colebrook river, one branch of which passes by Tempo, is the only considerable stream that flows into the lake from the north.

The climate is somewhat cold and moist: violent winds are common in winter, and render the navigation of the lake dangerous.

There has not hitherto been anything published on the subject of the geology of this part of Ireland. Limestone occurs throughout the mountainous district, and in the islands of Loch Erne. The general character however of this part of the county is understood to be the same with that of the Loch Allen coal district, of which sandstone and grit are the principal constituents. The remainder of the county would appear to belong to the greywacké formation.

The soil for the most part is naturally cold and moory, but has been brought into a good state of productiveness throughout the arable districts. Timber is generally of a good growth: at Florence Court in particular the timber is very large. As the condition of the peasantry in Fermanagh is better than in the neighbouring counties, and the potato does not constitute the whole of their food, the sales of grain at the local markets appear comparatively small. The following are the returns for 1835:—

	Wheat. Tons.	Oats. Tons.	Barley. Tons.	Rye. Tons.	Bere. Tons.	
Enniskillen .	26¼	1,355	..	50¼	408	Market increasing
Irvinestown .	..	90	..	..	..	„ stationary.
Kish . . .	..	87	..	..	19	„ increasing.
Lisnaskea . .	143¼	4,170	14	29¼	..	„ do.
Maguire's Bridge	..	3	1-5th	..	..	„ decreasing
Newtown Butler	125	97	..	..	..	„ stationary.
Derrygonnelly .	..	37	..	..	..	„ do.

Fermanagh is divided into eight baronies, viz., Lurg on the north, containing the rising town of Irvinestown, population 1047; Tyrkennedy on the north-east, containing part of Enniskillen, total population 6056; and the village of Lisbellaw, population 242; Magherastephana on the east, containing the town of Maguire's Bridge, population 854; and the village of Lisnaskea, population 430; Clankelly, also on the east; Coole on the south-east, containing the village of Newtown Butler, population 412; Knockinny on the south; Clanawley or Glenawley on the south-west; and Magheraboy on the west.

The linen manufacture is carried on to some extent, but does not form any considerable branch of commerce. The fair of Maguire's Bridge is much frequented by purchasers of horses and young cattle. Still Fermanagh cannot be said to have any staple or brisk trade. The produce of the county is, in a great measure, consumed within it; and the absence of external traffic is perhaps in this case an evidence of the comfort of the people.

Table of Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	11,969	..	..	..	..	..	..	71,800
1813	Under Act of 1812 . . .	19,291	..	..	..	..	..	..	111,250
1821	Under Act 55 Geo. III. c. 120	22,585	25,263	..	..	..	63,627	67,370	130,997
1831	Under Act 1 Wm. IV. c. 19 .	25,781	28,132	20,617	2,977	4,538	73,117	76,646	149,763

Fermanagh was first erected into a county by statute of the 11th of Elizabeth; but it was not till the time of the plantation of Ulster that it was finally brought under civil government. Having fallen to the crown by the attainder of Maguire, it was divided in like manner with the other five escheated counties among Scottish and English undertakers and native Irish. The precincts or baronies of Knockinny and Maghenaboy were allotted to Scottish undertakers; those of Clankelly, Magherastephana, and Lurg, to English undertakers; and those of Clanawley, Coole, and Tyrkennedy, to servitors and natives. The chief proprietors under the new settlement were the families of Cole, Blennerhasset, Butler, Hume, and Dunbar. The subsequent forfeitures of 1641 affected a large portion of Fermanagh, and considerably increased the possessions of those from whom many of the present proprietors are descended. The forfeitures consequent on the war of the Revolution affected only 1945 acres in this county, valued at 389*l.* per annum. [ENNISKILLEN.]

Fermanagh returns three members to the Imperial Parliament, viz., two for the county, and one for Enniskillen, the assize town, which is the only borough or corporate town within this county.

The public expenses of the county are defrayed by grand jury presentments: the amount so levied in the year 1829 was 18,832*l.* 14*s.* 3½*d.* The constabulary force employed in Fermanagh in the year 1835-6, consisted of 5 chief constables, 21 constables, 86 sub-constables, and 4 horses; the cost of which establishment was 4734*l.* 8*s.* 5*d.*

There has not been any statistical survey of Fermanagh published.

(*Ordnance-Survey Map of Fermanagh*; Harris's *Hibernica*; Inglis's *Ireland in 1834*.)

FERMAT, PIERRE DE, was born at Toulouse in 1595, and was brought up to the profession of the law. We have but few incidents of his private life, except that he became a counsellor of the parliament of his native town, was universally respected for his talents, and lived to the age of seventy years. His works were published in 1670 and 1679, in folio: the last volume contains his correspondence, besides some original scientific papers.

Fermat restored two books of Apollonius, and published

Diophantus, with a commentary. The whole of the actual works of Fermat fill an exceedingly small space; nevertheless they contain the germs of analytical principles which have since come to maturity. In fact they may be regarded, generally speaking, as announcements of the results to which he had arrived, without demonstrations, or any indications of the processes employed.

The properties of numbers were the subject of his enthusiastic researches, and no single individual has added more that is both curious and useful to this branch of mathematics than Fermat: the theorem now commonly called Fermat's is but a particular case of a much more general one given in his works.

His method for finding Maxima and Minima has only the merit of a moderate ingenuity, before the differential calculus was discovered; the analysts of that day hovered on the brink of that beautiful process of analysis which has been rather ridiculously termed the greatest discovery of the human mind. A method not very remote from Fermat's was practised by other analysts of his day; and in spirit also by the antient geometers: but it certainly is not the differential calculus, and Laplace has no ground for his attempt to snatch from the claims of the English and German nations this grand step of analysis in order to appropriate it to his own.

In Fermat's correspondence with Father Mersenne, we find him, in a bungling manner, contesting with Roberval the first principles of mechanics, and maintaining that the weight of bodies is least at the surface of the earth, increasing both within and without, which is the direct opposite to the truth: and in one of his letters, when greeted by Mersenne with the retractation of his errors, he very disingenuously attempts to deny them, asserting that no body has a centre of gravity, with many similar trifles, which place in bold relief the immortal discovery of Sir Isaac Newton of the law of universal attraction, and add lustre to his predecessor Galileo, who escaped from similar paradoxes, from which common sense ought to have guarded both Fermat and Descartes.

The correspondence of Fermat is sufficiently replenished with vanity, which was also well fed by some of his compatriots, who lauded his propositions as the finest things which had ever been discovered. But it is justly suspected that the discovery of many of his properties of numbers was effected by a tentative process, he himself possessing no demonstration, as no vestige remains in the works published by his son of any peculiar analysis for arriving at them; while there are abundant proofs that he and Frenacle, a young Parisian, employed the methods of tabulation and trial, to suggest properties, and by further trials, observe if they could generalize them. In a subject less barren than the theory of numbers this talent and industry would have produced more useful results; for what are the theorems of Fermat to the laws of Kepler?

Fermat conjectured that the path of light, in passing from air to a denser medium, ought to be such as to describe the shortest possible course. This is a particular case of the principle of least action, and requires some remark. First, we see that Fermat's method for finding maxima and minima was not the differential calculus, for though importuned from various quarters to try this principle he was deterred, as he says himself, for two or three years, by the dread of the asymetries of the process, though any tyro acquainted with the first principles of the differential calculus, with the proper data given, would now do it in five minutes: when Fermat at last did this, it was in a geometrical manner. Secondly, during the life of Descartes, he seems to have disbelieved this law of refraction. The foundations of both their reasonings in natural philosophy were of the slenderest description, if indeed we can at all use such a term as reasoning to the methods of Descartes, whose followers had the greatest faith when he employed the least of that useful faculty. But the law is truly attributable to Snellius, and, though this is well known, many French writers still ridiculously talk of the Cartesian law of refraction. Thirdly, Fermat did not attribute the truth of the principle to any mechanical laws, of which he seems to have known nothing, but to the pseudo-physical principle that nature should take the shortest course in performing its operations—for which, indeed, he was subjected to several cases of objection, to which he has given good answers, considering the position in which such an hypothesis placed him.

To give a more exact idea of the man, we shall give one of his problems, entitled 'Problem by P. de Fermat. To Wallis, or any other mathematician that England may contain, I propose this problem to be resolved by them.

'To find a cube number which, added to its aliquot parts, will give a square number? Example 343.

'If Wallis and no English mathematician can solve this, nor any analyst of Belgic or Celtic Gaul, then an analyst of Narbonne will solve it.'

Wallis gives an account of this in the *Commercium Epistolicum*, the correspondence having been conducted through Sir Kenelm Digby. The works of Fermat contain also the tangents to some known curves, and some centres of gravity.

Though thus strongly endowed with the faculty of self-esteem, and of that cunning which seeks to hide the tracks of discovery, we must still place Fermat among such men as Pascal, Barrow, Brouncker, Wallis; but he had none of the masculine mind of Descartes, nor a particle of the penetrating spirit of the glory of his age and nation, Newton.

It would be wrong to omit here the most curious of the theorems of Fermat relative to numbers. To make it more generally intelligible we may state, that a triangular number means the sum of any number of terms from the first of the natural numbers 1, 2, 3, 4, 5, &c.; thus 1, 3, 6, 10, &c., are triangular numbers; the square numbers are 1, 4, 9, 16, &c., and are the sums of the progression 1, 3, 5, 7, &c.; pentagonal numbers in like manner are the sums of the numbers 1, 4, 7, 10, &c., viz., 1, 5, 12, 22, &c. The theorem consists in this, that *every number* is the sum of 1, 2, or 3 triangular numbers; every number is the sum of 1, 2, 3 or 4 square numbers, and so on. In the works of Euler, Legendre, and Barlow, the demonstrations of the first two cases may be found; and though Legendre and Cauchy have both laboured to prove it more generally, yet our present impression (not having Cauchy's work at hand) is that the general theorem is still without proof.

FERMENTATION denotes the spontaneous changes which occur in certain vegetable and animal matters, and by which there are produced new fluid and gaseous compounds. Fermentation is of three kinds: the *vinous*, producing alcohol; the *acetous*, yielding vinegar; and the *putrefactive*, of which the products are very variable, and usually fetid.

When the expressed juice of grapes is exposed in warm weather to the air, which is necessary to the operation, it soon becomes turbid, its temperature rises a few degrees, a motion occurs in the fluid, and minute bubbles of air form and break. As the process goes on, a thick froth, consisting of these bubbles and viscid matter, rises to the surface; and when these bubbles have burst, a viscid substance falls to the bottom of the vessel: this possesses the property of causing fermentation to take place in other fluids, which, without its presence, would not undergo such a change. this substance is called *yest*. [YEST.]

In order to observe what happens during this *vinous* fermentation, dissolve some sugar in four times its weight of water, and add the solution to a small quantity of fresh yest, obtained as above described or from the fermentation of beer. Expose this mixture, in a flask with a bent tube and a bottle for receiving the gaseous products, to a temperature of about 75°; it will soon be found that the substances will so act upon each other as to produce carbonic acid, which will be found in the gas-bottle, while the sugar will gradually disappear, and the flask will contain a mixture of water and spirit, or alcohol; this is separated by distillation. These changes occur without the interference of the air or its oxygen; nor does it appear that water is decomposed, or that anything is added by the yest; it seems therefore that when sugar is deprived of oxygen and carbon, in the form of carbonic acid, it is converted into alcohol. Now alcohol consists of 3 equivalents of hydrogen = 3, 2 equivalents of carbon = 12, and 1 equivalent of oxygen = 8; its equivalent is therefore 23. In order then that alcohol and carbonic acid alone should be produced from sugar, this last substance must consist of 3 equivalents of hydrogen = 3, 3 equivalents of carbon = 18, and 3 equivalents of oxygen = 24, giving 45 as its equivalent. On this admission, the production of alcohol by the separation of carbonic acid from sugar may be thus shown:—

	Hydrogen.	Carbon.	Oxygen.	
Sugar . . .	3	3	3	equivalents.
Carbonic acid .	0	1	2	,,
Alcohol . . .	3	2	1	,,

This would however show that sugar contains a larger quantity of carbon than is usually assigned to it. According to Gay Lussac, 100 parts of sugar should yield 48·76 of carbonic acid and 51·34 of alcohol, which is very nearly in accordance with the above theoretic statement.

Although sugar appears to be the only vegetable matter which yields alcohol by its decomposition, yet it is to be observed that pure sugar suffers no fermentation. In the juice of the grape, as well as in some other cases, there is some accompanying matter which acts as a ferment; and when yest is thus spontaneously produced it causes fermentation in sugar, without, as far as appears, adding anything important; indeed it is stated that scarcely two per cent. of this substance suffer decomposition. It would therefore almost appear to produce the effect by what has been termed *an action of presence*, and by Berzelius denominated *catalysis*.

In brewing and distilling, and in vinegar-making in this country, the substance fermented is malt, in which the starch that the grain contains has by incipient vegetation been converted into sugar, and thus rendered fermentible.

In the *acetous* fermentation the materials employed are similar to those used for the vinous; but the temperature employed is higher. Little acetic acid is produced unless atmospheric air be present, the oxygen of which may combine directly with the requisite proportions of oxygen and carbon to constitute acetic acid; but as alcohol may be converted into vinegar, as indeed is practised in wine countries, it is possible, even when vinegar is produced from malt, that the previous formation of alcohol may occur; and this view will best explain what happens, and show that by the mere absorption of oxygen so as to form water, and without the evolution of any carbonic acid, acetic acid may be formed: thus—

	Hydrogen.	Carbon.	Oxygen.
Two equivalents of alcohol	= 6	4	2 equivalent
One equiv. of acetic acid	= 3	4	3 ,,
Hydrogen in excess . .	= 3		1 eq. deficient.
Absorb of oxygen . .	= 3		1 eq. absorbed = 4.
And form of water . .	= 3		

The above shows that by exposing 2 equivalents of alcohol to the air, and by the absorption of 4 equivalents of oxygen, there are formed 1 equivalent of acetic acid and 3 equivalents of water, while the 4 equivalents of carbon remain entirely in the acetic acid produced. [ACETIC ACID.] The constitution of acetic acid is then 3 equivalents of hydrogen = 3, 4 equivalents of carbon = 24, and 3 equivalents of oxygen = 24, giving 51 as its representative number.

With respect to the *putrefactive* fermentation, it is to be observed that it is the spontaneous decay and decomposition of vegetable and animal matter, which is unaccompanied with the production of alcohol or acetic acid. In vegetable putrefactive fermentation the principal product is carbonic acid, and probably water, both derived from the absorption of the oxygen of the air, which unites with the hydrogen and carbon of the vegetable matter. In the putrefactive fermentation of animal matter ammonia is a very usual product, owing to the presence of azote, which enters largely into the composition of animal matter in general, and thus, by uniting with the hydrogen, the alkali just mentioned is produced.

FE'RMO ED A'SCOLI, is the name of a Delegazione or province of the Papal State, east of the Apennines, bounded on the east by the Adriatic, on the north and north-west by the province of Macerata, on the west by the province of Spoleto, and on the south by the Abruzzi. It forms part of the old province of the Papal State called the Marches, the antient Picenum, which is now subdivided into three provinces, Ancona, Macerata, and Fermo. The province of Fermo is hilly, being occupied by various offsets of the Apennines, which, detaching themselves from the central ridge extend to the coast of the Adriatic, and form numerous valleys watered by rivers or rather torrents, the principal of which are, from north to south, the Chienti, the Tenna, the Aso, the Tesino and the Tronto. The length of the province along the Adriatic coast is 30 miles, and its breadth from the sea to the central Apennines is about the same. The area is about 1070 English square miles and its population 160,000 inhabitants. (Calindri, *Saggio Statistico dello Stato Pontificio*; Neigebaur, *Gemälde Italiens*.) The chief produce of the country consists in corn and cattle; wine and oil are also made. The principal towns are—1st, ASCOLI with 12,000 inhabitants; 2nd, Fermo, a pleasant town and a bishop's see, built on high ground, about four miles from the sea, and surrounded by old walls and ditches, with several churches and convents, and 6000 inhabitants, who carry on some trade by means of the neighbouring small harbour called Porto di Fermo. The exports are chiefly corn and wool. The antient Firmum, a town of the Piceni, afterwards a Roman municipium, was destroyed in the fifth century by Alaric, and the present town was rebuilt near its ruins. 3rd, Sant 'Elpidio, near the mouth of the river Tenna, has 3000 inhabitants. 4th, Ripatransone, a walled town about five miles from the coast and near the Tesino, has 2000 inhabitants. 5th, Grottamare, a thriving town on the coast near the site of Cupra Maritima, an antient Etruscan colony, carries on some trade by sea, has some sugar refineries, and about 4000 inhabitants. Pope Sixtus V. was born in this place. 6th, Offida, on a hill south of the Tesino, has a handsome collegiate church, some manufactories of lace, and about 3000 inhabitants. 7th, Montalto, a walled town but decayed, has only 600 inhabitants.

FERMOY, in the parish of Fermoy and barony of Condons and Clongibbons, in the county of Cork, in Ireland, situated on the right bank of the Blackwater, on the great southern road leading from Dublin to Cork, distant from Dublin 112 Irish, or 142 English miles.

Fermoy is quite a modern town, and owes its origin to its late proprietor, Mr. Anderson, the introducer of mail-coach travelling into Munster. This enterprising individual began to build here about the beginning of the present century. The site being of equal importance in a military and in a civil point of view, induced the government to second his design by the erection of very extensive barracks. An act was obtained for providing the town with a police; and various manufactures, including a brewery, paper-mill, and bolting-mill, were set on foot by Mr. Anderson. In the erection of all the buildings a regular design was observed, and hence Fermoy presents an appearance of neatness and uniformity very rare among Irish towns. In 1815 trade in Fermoy was very brisk, but has since materially declined. The manufacture of ale and the purchase of corn are still carried on to a considerable extent, but want of employment is neverthless severely felt.

The appearance of Fermoy is imposing: the town extends on each side of a handsome square, facing the northern end of the bridge. The church, from a design by Hargrave, is much admired: there is also a chapel, and a church of Wesleyan Methodists. The barracks, which are very extensive, occupy the brow of a bold elevation on the opposite side of the river. The surrounding country is rich and diversified, and the number of resident gentry considerable. The place is very important as a military station, and the garrison generally consists of several regiments. The population of Fermoy in 1821 was 6702, and in 1831 was 6976, the garrison included. In the parish of Fermoy there were in 1834 sixteen schools educating 470 males and 294 females. In the Fermoy National School, established Sept. 1833, there is an average daily attendance of 270 young persons. (Townsend's *Statistical Survey of Cork*, Cork, 1815; Inglis's *Ireland in 1834*; *Parliamentary Papers, &c.*)

FERNANDEZ, JOAN, a Portuguese, the first European who visited the interior of Africa. In 1446 he joined a Portuguese expedition of discovery, and from an ardent desire to procure information for Prince Henry, he got leave to remain among the Assenhaji, or wanderers of the great African desert, in its Atlantic extremity. His account has been strikingly corroborated in our days by that of Mungo Park. (Kerr's *Systematic Collection of Voyages and Travels*, ii. p. 190.)

FERNANDEZ, DENIS, a Portuguese navigator, who, in 1446, discovered the river Senegal and Cape Verde.

FERNANDEZ, NAVARRETE, surnamed El Mudo (the dumb), born 1526 at Logroño, on the Ebro, became a distinguished pupil of Titian, and painter of Philip II., who employed him chiefly at the Escurial. His principal work is Abraham with the Three Angels. He painted with great ease and despatch. On account of his colouring he was

called the Spanish Titian. There are many of his paintings in the Louvre.

FERNANDEZ, FRANCISCO, born at Madrid, 1604, was, according to Palomino, one of the most ingenious painters of his time. He was employed by Philip IV. of Spain to execute several considerable works.

FERNANDEZ, ANTONIO, a native of Madrid, became a distinguished painter at fourteen, and one of the most eminent of Spain at twenty-five. Among his best works are eleven pictures of the Passion of Jesus Christ.

FERNANDEZ, ANTONIO. [TELLEZ.]

FERNANDEZ, JUAN, is the name of a small group of islands in the Pacific, about 400 miles from the western coast of South America. The group consists of two larger islands, Masatierra (more landward) and Masafuera (more seaward), and a few small rocks. Masatierra, which alone is often called Juan Fernandez, is situated in 33° 40′ S. lat. and about 100° W. long. Masafuera, which is more than 2° farther west, in the same latitude, is a heap of immense rocks rising precipitously from the sea to the height of 3000 feet and more, without any convenient landing-place. Masatierra, the larger of the two, is about 18 miles long, but only 6 miles across in its widest part. Its northern half is also an elevated mass of trap and basalt rocks, furrowed with pleasant valleys and mostly covered with wood; its southern half, which is only slightly raised above the sea, is rocky and barren. Towards the northern extremity is Cumberland Bay, which affords safe anchorage for vessels of any size. Goats in a wild state are found here; and on the rocky shores seals and sea-lions. Fish are very plentiful, especially cod. It is not known when these islands were discovered by Europeans. The Buccaneers of the seventeenth century finding them uninhabited, made them a place of resort during their cruises on the coasts of South America. On one occasion, a Scotchman named Alexander Selkirk being left on the island of Masatierra, lived there more than four years. His adventures are commonly, though incorrectly, said to have supplied Defoe with materials for his Robinson Crusoe. Lord Anson refitted his vessels here in 1741, and in 1749 the Spaniards formed a settlement. It seems however that after some time it was abandoned, and remained without inhabitants up to 1819, when the republic of Chile occupied it for the purpose of using it for state prisoners, but it has been abandoned by them also. It is said that some Americans and Taheitians have lately settled in Cumberland Bay. The island is very subject to earthquakes. In 1751 the small Spanish settlement was nearly ruined; the sea rose and overwhelmed the houses near the sea-shore, and thirty-five persons perished. In 1835 an eruption burst through the sea near Bacalao Head, a mile from the land, where the depth is from 50 to 80 fathoms; smoke and water were thrown out during the greater part of the day, and flames were seen at night. In the present year (1837) the newspapers have reported that the whole island has been sunk to the bottom of the sea by an earthquake; but this report requires confirmation. (Anson's *Voyage; London Geographical Journal*, iv. and vi.; *Campaigns and Cruises in Venezuela and New Granada, &c.;* Meyen's *Reise um die Welt;* Ulloa's *Voyage to South America;* Byron's *Voyage;* Carteret's *Voyage; Extracts from* Capt. Moss's *MS., published in the Athenæum,* vol. i. p. 581.)

FERNANDO PO, an island situated on the western coast of Africa, in the Bight of Benin, 3° 25′ N. lat., and 8° 50′ E. long., is about twenty-four miles long, and sixteen wide. Its surface, which is very uneven, rises towards the centre into two summits, whose elevation is estimated at more than 2000 feet above the sea. It is mostly covered with wood, and is everywhere well watered and fertile. Yams, palms, and other tropical plants, are grown abundantly; and turtles and fish are plentiful. The climate is considered healthy. There are several small harbours; the largest is Maidstone Bay, on the northern shore, which is formed by a headland called Point William, rising 150 feet above the sea, on which stands the English settlement of Clarence Town, established in 1827. This island was discovered in 1471 by the Portuguese, who in 1778 ceded it to Spain. The Spanish government tried to settle it, but the inhabitants destroyed the colony. These natives are not so black as the negroes, and their hair is longer, which some ascribe to their mixture with Spanish blood; their number amounts to about 1200. In 1827 the English, with the permission of Spain, took possession of the island, which promises to be of importance, since it has been discovered that the Joliba or Quorra, the largest of the African rivers, falls into the sea by several channels nearly opposite Fernando Po. This island is also of importance for the suppression of the slave trade, which cannot be so effectually checked from any other station as from this island. (Monrad, *Gemählde der Kuste von Guinea.*)

FERNEY. [AIN.]

FERNS, a bishop's see in the archdiocese of Dublin, in Ireland. The chapter consists of a dean, precentor, chancellor, treasurer, archdeacon, and ten prebendaries. This diocese occupies the whole of the county of Wexford, and a small part of the county of Wicklow. In 1792 it was divided into 143 parishes, constituting 40 benefices, and contained 40 churches of the establishment. In 1834 the numbers were:—parishes, 140; benefices, 57; churches of the establishment, 62; other places of worship in connection therewith, 2; Roman Catholic houses of worship, 91; Presbyterians, 1; and other Protestant dissenting do., 14. In the latter year the gross population of the diocese was 197,780, of whom there were 24,672 members of the established church, 172,780 Roman Catholics, 19 Presbyterians, and 300 other Protestant dissenters, being in the proportion of one Protestant, of whatever denomination, to seven Roman Catholics nearly. There were at the same time in this diocese 301 daily schools, educating 15,970 young persons, being in the proportion of $8\frac{8}{100}$ per cent of the entire population under daily instruction, in which respect Ferns stands fifteenth among the thirty-two dioceses of Ireland. Of the above schools, 19 were in connection with the National Board of Education in 1834.

This diocese was founded about A.D. 598 by St. Edan, otherwise Moedoc, who had received a grant of Ferns from Brandubh, king of Leinster. During the life of Edan this see ranked as an archbishopric, and was head of the ecclesiastical province of Leinster. It was united with the see of Leighlin in the year 1600, which union still subsists; and is by 3rd and 4th William IV. c. 37 farther increased by the addition of the see of Ossory when next void.

The town of Ferns is a place of considerable antiquity, but much decayed. It is situated in the parish of Ferns and barony of Scarewalsh, in the county of Wexford. The cathedral, which is also the parish church, is a mean building; but the palace, built by Dr. Cope, is handsome and commodious. There are some remains of an abbey founded by Dermot Mac Murrough, king of Leinster, and a ruined castle, said to have been his residence at the time of the English invasion. In 1831 Ferns contained 571 inhabitants. (Beaufort's *Memoir of a Map of Ireland; Reports of Commissioners, &c.*)

FERNS. [FILICES.]

FERRA'RA, LEGAZIONE DI, the most northern province of the papal state, situated for the greater part within the Delta of the Po, is bounded on the north by the main branch of that river called Po d'Ariano, which divides it from Austrian Lombardy, on the east by the Adriatic, on the west by the duchy of Modena, and on the south by the legations or provinces of Ravenna and Bologna. Its greatest length east to west is about 50 miles, and its greatest breadth 35 miles, but it becomes much narrower towards its western extremity. Its area is reckoned at 1106 English square miles, and the population at 205,000 inhabitants, distributed among 5 città or walled towns, 17 terre or small towns having a communal council, and 153 ville or villages and hamlets. (Calindri and Neigebaur.) The soil is naturally rich, but the greater part is swampy, and a considerable portion of the surface in the east part of the province is constantly under water. The chief productions are rice, corn, pulse, hemp, grass, both natural and artificial, wine, and a vast quantity of fish. The principal towns are: 1. Ferrara; 2. Comacchio, with 5400 inhabitants, situated on an island in the midst of extensive swamps which communicate with the Adriatic, and receive its water; these swamps, called le Valli di Comacchio, are divided into estates or tenements for the purpose of fishing. Immense quantities of fish of various sorts, and especially large eels, are caught here and pickled at Comacchio for exportation. A curious description of the habits, industry, and diversions of the people of this peculiar district is given by Bonaveri, *Della Città di Comacchio, delle sue Lagune, e Pesche*, fol., 1761. 3. Cento, with 4000 inhabitants. 4. Lugo, with 8800 inhabitants, in the southern part of the province, near the borders of Ravenna: this

town was plundered and nearly destroyed, in 1796, for having revolted against the French. 5. Bagnacavallo, with 3500. Among the terre or communes, the principal ones are: Argenta, with 4000 inhabitants, including its territory; Bondeno, 7000; Copparo, 7000; Cotignola, the birth-place of Attendolo, the celebrated Condottiere of the fourteenth century and the head of the ducal house of Sforza, has [illegible] inhabitants; Fusignano, the birth-place of the musical composer Corelli and of the poet Monti, has 4700; Mesola, with 4000, lies near the principal æstuary of the Po, called Porto di Goro, and has a considerable tract of forest to the south of it, extending along the sea-coast as far as the mouth of Volano, and abounding with game, wild boars, deer, &c.; Pieve di Cento has 3500 inhabitants; Ponte di Lagoscuro, a frontier town and custom-house on the south bank of the Po, and on the high road leading from Austrian Lombardy into the papal state, has 3600 inhabitants; Porto Maggiore has 6500.

The air in general throughout the greater part of the province of Ferrara, especially in the vicinity of the great swamps, is more or less unwholesome, particularly in summer, though the malaria is not quite so bad as in the southern maremme or in the Pomptine marshes. The country is flat, and in many parts much below the level of the Po, the water of which is kept in by strong dykes; but the river sometimes breaks through and produces dreadful inundations. The cost of keeping the dykes in repair is one of the heaviest charges on the province, and watching the rising of the river during the floods is a constant care of the peasantry. The Po, in the territory of Ferrara, divides itself into three principal branches,—the main one, or Po d'Ariano, the Po di Volano, and the Po di Primaro or southernmost branch, which last receives the Reno, the Santerno, the Senio, and other numerous streams which flow from the Apennines of Bologna. These various branches of the Po communicate with one another by canals. The Naviglio of Bologna communicates between that city and Ferrara, and the Canal di Cento between this town and the Po.

FERRA'RA, the capital of the province of the same name, and the residence of the papal legate or political governor, and an archbishop's see, is situated in the midst of a flat country on the north bank of an arm of the Po, in 44° 49′ N. lat. and 11° 41′ E. long., about four miles south of the main branch of the Po, which forms the boundary between the papal and the Austrian states, and twenty-five miles north-east of Bologna, and thirty-eight north-west of Ravenna. It is a large and well-built town, with streets wide and straight, the principal of which, called San Benedetto, is about 2000 yards in length. Ferrara is enclosed by walls, and defended on the west side by a citadel regularly fortified, which, agreeably to a stipulation of the congress of Vienna, is garrisoned by Austrian soldiers, as well as the neighbouring town of Comacchio. In the middle of the town is a castle, flanked with towers and surrounded by wet ditches, which was once the residence of the dukes, and is now that of the legate. Ferrara has numerous churches, most of them rich in paintings, by Guercino, the Caracci, and other great masters of the Bolognese school; and also by Garofalo, Bastianino, Ortolano, and other painters natives of Ferrara, who are classed by some as forming a separate school, called that of Ferrara. The finest churches are: the cathedral, built in the twelfth century, adorned with sculptures, bronze statues, and frescoes; San Benedetto, in which Ariosto was buried; his monument however has been transferred to the Lyceum: in the hall of the refectory of the adjoining convent is the painting of the Paradise, by Garofalo, the friend of Ariosto, who introduced in it the likeness of the poet; San Domenico, which has several valuable paintings and the monument of Celio Calcagnini, one of the restorers of learning in the 16th century; Santa Maria del Vado, the oldest church of Ferrara, which is also very rich in paintings, and contains the tombs of Garofalo, Bastianino, Ortolano, and other native painters; and the churches San Francesco, i Teatini, il Gesù, &c. Among the palaces of Ferrara, the finest are those of Villa and Bevilacqua. The theatre is one of the largest and finest in Italy. The house of Ariosto, which he purchased himself, is shown to strangers, but his favorite garden has disappeared; the old house of his family, in which he had been brought up, still exists, and is called Casa degli Ariosti. The University of Ferrara, which is attended by about 300 students, has a valuable library of 80,000 printed volumes and 900 MSS., among which are autographs of Ariosto, Tasso, Guarini, and many editions of the fifteenth and sixteenth centuries, when the presses of Ferrara were among the most active in Europe. (Baruffaldi, *Della Tipografia Ferrarese.*) Ferrara has produced many distinguished writers, of whom Barotti has given a biographical list. (*Memorie Storiche dei Letterati Ferraresi*, 2 vols. 4to. 1792.) In the hospital of St. Anna is still seen the small room on the ground floor in which Tasso was confined for seven years.

Ferrara is one of the most interesting and handsomest of the modern towns of Italy, for it has no claims to classical antiquity, having risen after the fall of the empire. It was walled round by the Exarchs in the sixth century. Its present state of decay has been somewhat exaggerated: it lost part of its population in the seventeenth century, in consequence of having lost its sovereigns [ESTE], and having become a provincial town; but it is now again on the increase, having risen from 23,000, which it reckoned under Napoleon, to 31,000 inhabitants, of whom above 2000 are Jews, who occupy a separate quarter, and have a synagogue. (Valery, *Voyages Littéraires en Italie*, and Calindri, *Saggio Statistico.*) It carries on a considerable trade in corn and other produce of the soil. Society is said to be very agreeable at Ferrara, and its natives hospitably inclined towards strangers. The air, though not positively bad, is not very wholesome, on account of its situation. (Frizzi, *Memorie per la Storia di Ferrara*, and *Guida al forestiero per la Città di Ferrara;* De Rossi, *De typographia Hebræo-Ferrariensi;* and Barotti, *Pitture e Sculture che si trovano nelle Chiese e Luoghi pubblici di Ferrara.*)

FERREI and **FERRARI**, the names of two Italian mathematicians, who were nearly contemporary with each other, and who are liable to be confounded. Scipio Ferrei (Cossali calls him Ferro and Dal Ferro) was a native of Bologna, and taught mathematics there from 1496 to 1526. He is said to have been the first who possessed a method of solving any case of cubic equations: this method he communicated to his pupil Antonio del Fiore, who proposed a question to Tartaglia as a challenge; and this, it is also said, was the cause of the latter turning his attention to the subject.

Ludovico Ferrari was also born at Bologna, and was the pupil of Cardan. At the instigation of the latter, he turned his attention to biquadratic equations, and produced the method known by his name, being the first which had been invented. The method is found in the work of Cardan (from whom the account of Ferrari is taken), and in all works of algebra which treat on the solution of equations.

FERREIRA, ANTONIO, the reformer of the national poetry of Portugal, and surnamed the Portuguese Horace, was born at Lisbon, 1528. While studying law at Coimbra he devoted his time more particularly to classical and Italian literature, and composed his drama of 'O Bristo' (which is the name of the principal character), to which he gave subsequently a much higher polish. Growing tired of a university life, he went to court, where he obtained a dignified situation, and while entertaining still higher expectations he was carried off in the prime of life by the plague in 1569.

Although not a first-rate poet in imagination and originality, Ferreira possessed taste, correctness, and deep thought. He often succeeded moreover in elevating the mind and warming the heart. His sonnets, without displaying any affected imitation of Petrarca's, remind us of the Italian poet and his Laura. His odes and his bucolics have great merit in the expression, but the former want the genuine lyric spirit, and the latter the simplicity of the idyl; qualities perhaps irreconcilable with Ferreira's philosophical turn of mind and didactic seriousness. Among his elegies, that on May is a classic masterpiece. His epistles, written evidently when he was in his maturity, are the first productions of the kind in Portuguese literature. His tragedy of 'Ines de Castro,' written about the same time that the Dominican Bermudez wrote the similar and superior one in Spanish of 'Nise Lastimosa*,' abounds with beautiful passages, but is deficient in true pathos, and displays a forced imitation of the Greek manner and style. As it was preceded only by Trissino's 'Sophonisba,' it has

* 'Primeras Tragedias Españolas de Antonio de Silva,' Madrid, 1577. Introduction to the 6th vol. of the 'Parnaso Español.'

been considered as the second regular tragedy produced after the revival of letters in Europe. His 'Poemas Lusitanos' appeared at Lisbon first in 1598, 4to.; and all his works were printed under the title 'Todas as Obras de Ferreira,' Lisbon, 1771, 2 vols. 8vo., which contain Ferreira's biography, a valuable authority for the reader, in addition to that of Bouterwek.

FERRE'RAS, DOCTOR DON JUAN, born at Labañeza, in the diocese of Astorga, a most minute and accurate historian, and one of the writers who have done great service to Spain, as Feyjoo did after him in banishing prejudices, and Flores in his researches on ecclesiastical antiquities. Having gone through a complete course of classical and theological learning, Ferreras displayed his eloquence in the pulpit, and obtained the patronage of the great by his merit, and the esteem of all by his gentleness and modesty. Various honorable distinctions and situations were bestowed on him, but he constantly refused all high dignities. Next to the duke of Escalona, he was at the head of the litterati who founded the academy of the Lengua Española in 1713, and he was a very useful member of that body, especially in the compilation of its dictionary, in 6 vols., folio, published in 1726—1739, to which he contributed the articles in the letter G, besides a preliminary discourse on the Castilian tongue. At his death, 1735, in addition to his other appointments, he held that of librarian to Philip V. Ferreras, though not so elegant a writer as Mariana, is much more to be depended upon. He wrote in all thirty-eight works, some of which remain unpublished; the most important is the 'Synopsis Historica y Chronologica de España,' Madrid, 1700—1727, 16 vols., 4to. It extends to the close of Philip II.'s reign in 1588, and not merely to the three years previous to the capture of Granada, as it is very strangely stated by the writer in the 'Biographie Universelle,' after mentioning its reaching to the year 1589, which is near a century after the re-conquest of Granada. Hermilli translated it into French, with valuable notes, in 10 vols., 4to., Paris, 1742.

FERRET. [MUSTELIDÆ.]

FERRO, or **HIERRO**, is a small island belonging to the group of the Canaries. [CANARIES] Its surface occupies only 10¼ square leagues, and the population is about 1500. The name Ferro is familiar to most persons from the circumstance of the first meridian having been drawn through it. Geographers wishing to have a meridian circle which should intersect only the seas that divide the old from the new continent, and none such existing but that which traverses the island of Ferro and cuts off only a small part of the north-eastern extremity of Asia, this island was accordingly fixed upon as the first meridian. For the purposes of navigation, however, it was necessary that charts should be constructed with reference to the meridian of a place where chronometers could be adjusted with the greatest exactness. Accordingly, the first meridian was removed from the island of Ferro to the several places where observatories are erected; by the English to Greenwich, by the French to Paris, and by the Spaniards to Cadiz. The French finding that Paris was nearly 20° 30′ east of Ferro, removed the first geographical meridian to exactly 30′ east of Ferro; so that at present the island of Ferro is considered as being about 30′ west of the meridian of Ferro. The meridian of Greenwich is 17° 41′ east of that of Ferro, and the meridian of Cadiz 6° 16′ west of Greenwich, or 11° 25′ east of Ferro. Other nations, whose navigation is less extensive, generally use English charts, and hence the meridians of their own observatories are not mentioned except in scientific works.

FERROCYANIC ACID was discovered by Porret, and by him called *ferruretted chyazic acid*. He procured it from the decomposition of ferrocyanide of potassium by the action of tartaric acid, or from ferrocyanide of barium by means of sulphuric acid. According to Berzelius it is best prepared by diffusing recently precipitated ferrocyanide of copper or lead through water, and passing hydrosulphuric acid gas through the mixture; the sulphur precipitates the copper or lead in the state of sulphuret, while the hydrogen uniting with the cyanogen and iron they form ferrocyanic acid, composed of (when dry and not crystallized)—

Hydrocyanic acid	46.57
Cyanide of iron	45.77
Water	7.66
	100,

and it contains 23.27 per cent. of iron.

P. C., No. 625.

Any excess of sulphuric acid is to be got rid of by adding ferrocyanide of the metal employed. The solution should be quickly filtered and evaporated in vacuo over sulphuric acid. A white residue is obtained which when dissolved in water is inodorous, sour, reddens litmus paper, decomposes the alkaline carbonates with effervescence, forms ferrocyanides with them, and exhibits other proofs of a strong acid. When exposed to spontaneous evaporation in a warm place, colourless radiating crystals are observed, which have the appearance of four-sided prisms. This acid is decomposed by long exposure to the air, Prussian blue being formed and precipitated; this is also produced by adding it to a persalt of iron.

The aqueous solution is also decomposed by boiling; and when submitted to destructive distillation it yields hydrocyanic acid, hydrocyanate, and carbonate of ammonia, and carburet of iron remains.

FERRO'L, a sea-port town of Gallicia in Spain, on a bay which is an arm of the bay of Betanzos, or of La Coruña, from which last town Ferrol is fifteen miles distant to the north-east across the bay, but the communication by land is much longer. The port of Ferrol is large and safe, and its entrance is defended by strong batteries. There are extensive docks for the Spanish navy, Ferrol being one of the three royal dockyards: Carthagena and Cadiz are the other two. The town of Ferrol is regularly built, the streets crossing each other at right angles. It has a school of navigation, about 13,000 inhabitants, some manufactures of hats, and carries on a considerable fishery of herrings and sardines, which are pickled and exported. The timber for ship building comes from Asturias, and the hemp for cables from Aragon; but the coal and tar are brought in by foreign vessels. Ferrol carries on some trade with America, exporting the wine, brandy, and corn of Gallicia and other parts of Spain. It is the residence of a commandant-general, and other chief officers of the naval department, which however, owing to the present decay of the Spanish navy, is not in a very active condition. Miñano, in his *Suplemento al Diccionario Geografico de España*, gives a plan of Ferrol, with a long article on its docks which are among the finest in Europe.

FERRY, an exclusive privilege by prescription or the king's grant for the carriage of horses and men across a river or arm of the sea for reasonable toll. The owner of a ferry cannot suppress it and put up a bridge in its stead without a license; but he is bound to keep it always in repair and readiness, with expert men, and reasonable toll, for neglect of which he is liable to be punished by indictment. And therefore if a ferry is erected so near to an antient ferry as to draw away its custom, it is a nuisance to the owner of the old one, for which the law will give him remedy by action. The ferry is in respect of the landing place, and not of the water, and in every ferry the land on both sides ought originally to have been in the same person, otherwise he could not have granted the ferry. (13 Vin. *Abr.* 208.) Though as all existing ferries are of great antiquity, and generally connect roads abutting on either side of the water, the original unity of possession is mere matter of curiosity. A ferry is considered as a common highway. (3 Bl. *Com.*; 13 Vin. *Abr.* 208.)

FE'RULA, a genus of apiaceous or umbelliferous plants, whose species often yield a powerful stimulating gum-resin employed in medicine. It differs from Pastinaca and Peucedanum by its fruit having several vittæ in each channel, and from Opoponax, which it otherwise resembles, in the margin of the fruit being thin and flat, not thickened and convex. The fruit is in appearance extremely similar to that of a parsnip; it is compressed from the back till it is extremely flat, and it thins away at the edge. There are three approximated filiform dorsal ridges, and the two lateral ones are distant, obsolete, or lost in the edge. In each channel there are three or more vittæ, and on the commissure four, or a great many. The flowers are always yellow, and the stem solid, its cavity being filled with a spongy substance, in which fibres are vaguely dispersed.

The drugs called Sagapenum and Assafœtida are produced by species of this genus, but by which in particular is not known with certainty; and it appears probable that in fact several different species yield those substances.

1. *Assafœtida*, as the more important, deserves notice first. Kæmpfer, whose account is by far the best we have of this plant (*Amœnitates Exoticæ*, p. 537), says that it is found in

only two districts of Persia, namely, the fields and mountains of Herat, the capital of Khorassan, and the range of mountains in the province of Lar (Laristan), extending from the river Cur as far as the town of Congoon, along the coast of the Persian Gulf. He states moreover that even here the plants do not always yield the drug; that it is only those of the desert near Herat and of the mountains round Disguun in Laristan that furnish it; and finally he figures a plant, with a naked simple stem, clothed with leafless sheaths, umbels without involucre, a coarse woody root rising above the ground, and pinnated leaves with pinnatifid segments and oblong obtuse lobes. This plant is the Ferula Assafœtida of Linnæus and De Candolle; what is supposed to be it has since been met with in Beloochistan, and Lieut. Burnes saw what he calls assafœtida growing in great luxuriance in the mountains of Hindoo Koosh at an elevation of 7000 feet. He states that it is an annual, and grows to the height of 6 or 10 feet, when it withers and decays. The milk which it exudes is first white, and then turns yellow and hardens, in which state it is put in hair bags and exported. Sheep browse upon the tender shoots, which are believed to be highly nutritious. (*Travels*, ii. 243.) It is however by no means certain that this was true assafœtida. Indeed if it was, as Lieut. Burnes states, an annual, it must have been some other plant; for Kæmpfer expressly describes the root of hingisch, or assafœtida, as 'ad plures annos restibilem, magnam, ponderosam, nudam,' and in fact it is from wounds in this root that the gum-resin flows. We may however be pretty certain that assafœtida is in fact yielded by different plants. Prof. Royle obtained seeds of two kinds from the bazaar of India; and it appears from a communication made to Mr. Macneill from a medical gentleman at Soomecana, in Beloochistan, that in that province a kind of ferula called hooshee yields a similar product, which however is not collected.

The F. assafœtida is said to arrive at as great an age as man himself, and in consequence its roots sometimes attain a considerable size. It is from wounds in this part that the drug is obtained. The roots are not wounded before they are four years old; the greater their age the better the quality of their produce. There were four operations each year when Kæmpfer visited the country; the first in the middle of April, the second at the latter end of May, the third ten days later, and the fourth in the beginning of July. The gatherers on the first occasion only cleared the hard sandy or stony soil away from the root to the depth of a span or so, pulling off the leaves, replacing the earth about the roots, and then heaping the leaves on them, pressing them down with a stone. On the subsequent occasions they slice the roots transversely, beginning a little below the top, and collecting the juice that flows from the wounds. After every operation they cover the root with the old leaves to screen it from the sun. After the last gathering the screens are thrown away, and the roots are left to perish.

2. *Ferula Persica*, a perennial species with a glaucous stem and supradecompound leaves with linear cut segments, has been reported to yield assafœtida. Dr. Hope entertained this opinion, from which Nees and Ebermaier do not dissent. Treviranus found it yielding a substance extremely like assafœtida, in the botanic garden of Breslau; and the same thing has often occurred in the Apothecaries' Garden at Chelsea. Nevertheless, Fée suspects, after Willdenow, that it is rather the origin of sagapenum. Olivier believed it to produce gum ammoniacum; but according to Professor Don, that drug is yielded by his Dorema ammoniacum.

3. *Ferula orientalis* has also been quoted as the source of gum ammoniacum; and it appears that such a substance is really produced, either by that plant or a nearly allied species, in the empire of Marocco.

4. *Ferula ferulago* has been taken for the plant which furnishes galbanum; but Professor Don states that this drug is really yielded by quite a different genus, called by him Galbanum officinale.

FERUSSINA, a genus established by M. Grateloup for a fossil turbinated shell from Dax, which seems at first view very near the *Anostoma*, but which M. Grateloup thinks, from the examination of its aperture, approximates more to the *Cyclostomata*, an opinion in which M. Rang concurs, adding that the species, three or four, are all fossil. It is the same shell, he states, as that afterwards described in the first number (livraison) of the Bulletin of the Linnean Society of Bordeaux, under the name of *Strophostoma* by M. Deshayes.

Generic Character.—Animal unknown. Shell oval, globulous; aperture round, bordered, oblique, simple, toothless, 'retournée du côté de la spire;' umbilicus more or less large. Operculum?

FESCENNINE VERSES were rude licentious verses sung by young men at weddings, and before the door of the nuptial chamber. This was a very antient custom at Rome: the practice, and some of the verses themselves, are said to have been introduced from Fescennium, an old Etruscan town near the present site of Civita Castellana. Festus and others derive the name Fescennine from 'fascinum,' a charm or evil influence, which was supposed to have the power of depriving persons of their physical strength, and which the Fescennine verses were intended to avert. Valletta, a Neapolitan lawyer and poet of the 18th century, has written a curious book on the 'Fascino,' or evil eye, the belief of which is still prevalent at Naples. The Fescennine verses were distinct from the epithalamia, which were more refined and regular compositions. [EPITHALAMIUM.] Horace (Epist. ii. 1) says that Fescennine verses were sung by the country people at harvest time; and the custom of dealing out licentious jokes upon each other and upon strangers passing by, is still retained by the vintagers in various parts of Italy. The name of Fescennine was given in general to licentious and satirical epigrams. Octavianus is said to have written some of this character against Pollio, in the time of the Triumvirate.

FESCUE. [FESTUCA.]

FESTU'CA, a genus of grasses containing several species of agricultural importance. It is known among British grasses by having many flowered spikelets, the lower paleæ of which are neither awned as in Bromus, nor blunt as in Poa and its allies, but terminated gradually in a hard sharp point.

F. pratensis, or meadow fescue, is about three feet high, with a nearly upright branched one-sided panicle and broad coarse leaves. It is a native of moist meadows, and forms a portion of most good meadow herbage. Mr. Sinclair states that in point of early produce this grass ranks next to meadow fox-tail (Alopecurus pratensis), and is much more productive.

F. ovina, rubra, and *duriuscula* are other agricultural grasses, much smaller than the last, and contributing greatly to the value of pastures. *F. ovina* has a fine succulent foliage, and, according to Linnæus, sheep have no relish for hills on which it does not abound; it is, however, unproductive. *F. rubra* is more abundant in its produce, but less nutritive, and its creeping root-like stems are said to impoverish the soil very much. *F. duriuscula* is preferable to both the preceding; it withstands dry weather better than most grasses, and in combination with Festuca pratensis and Poa trivialis forms excellent pasturage. It is most prevalent on light rich soils. *F. dumetorum*, another species, will thrive in dry sandy situations, to which property its value is chiefly owing; but its nutritive qualities are slight, and it is altogether an inferior species. See *Hortus Gramineus Woburnensis.*

FESTUS, SEXTUS POMPE'IUS, a celebrated Latin grammarian, whose age is not clearly ascertained, though there seems reason to believe that he lived in the third century of our æra. He compiled an epitome of the voluminous work 'De Verborum Significatione' of Marcus Verrius Flaccus, a grammarian of the Augustan age, mentioned by Suetonius. The work of Verrius is lost, and that of Festus being afterwards abridged in the ninth century by Paulus Diaconus, who spoiled it, the text of the epitome became lost also for several centuries, until a mutilated copy, found in Dalmatia, came into the hands of Aldo Manuzio, who published it, together with the abridgment by Paulus Diaconus. Other fragments were found in the Farnesian Library, and Antonius Augustinus, Joseph Scaliger, and Fulvius Ursinus published improved editions of Festus 'De Verborum Significatione.' Lastly, A. Dacier published a new edition, 4to., Paris, 1681, adding to it the notes of Scaliger, Augustinus, and Ursinus. Dacier's edition was reprinted at Amsterdam in 1699. Festus, in a passage of his work under the head 'Profanum,' refers to another vocabulary which he had written explanatory of antient Latin words which had become obsolete, 'Priscorum Verborum Libri cum Exemplis,' which words he left out in his epitome

of Marcus Verrius. This work, 'Priscorum Verborum,' is lost. Festus gives not only the meaning, but also in most instances the etymology, of words, with references to Verrius, Cato, and others of his predecessors; and his book, though incomplete, is justly classed by Scaliger among the most useful for understanding the language of antient Rome.

FEUD. [FEUDAL SYSTEM.]

FEUDAL SYSTEM. In treating of this subject we shall endeavour to present a concise and clear view of the principles of what is called the feudal system, to indicate the great stages of its history, especially in our own country, and to state briefly the leading considerations to be taken into account in forming an estimate of its influence on the civilization of modern Europe.

The essential constituent and distinguishing characteristic of the species of estate called a feud or fief was from the first, and always continued to be, that it was not an estate of absolute and independent ownership. The property, or *dominium directum*, as it was called, remained in the grantor of the estate. The person to whom it was granted did not become its owner, but only its tenant or holder. There is no direct proof that fiefs were originally resumable at pleasure, and Mr. Hallam, in his 'State of Europe during the Middle Ages,' has expressed his doubts if this were ever the case; but the position, as he admits, is laid down in almost every writer on the feudal system, and, if not to be made out by any decisive instances, it is at least strongly supported not only by general considerations of probability, but also by some indicative facts. This however is not material. It is not denied that the fief was at one time revocable, at least on the death of the grantee. In receiving it, therefore, he had received not an absolute gift, but only a loan, or at most an estate for his own life.

This being established as the true character of a primitive feud or fief, may perhaps throw some light upon the much disputed etymology and true meaning of the word. *Feudum* has been derived by some from a Latin, by others from a Teutonic root. The principal Latin origins proposed are *fœdus* (a treaty) and *fides* (faith). The supposition of the transformation of either of these into feudum seems unsupported by any proof. These derivations, in fact, are hardly better than another resolution of the puzzle that has been gravely offered, namely, that feudum is a word made up of the initial letters of the words 'fidelis ero ubique domino vero meo.' The chief Teutonic etymologies proposed have been from the old German *faida*, the Danish *feide*, or the modern German *vehd*, all meaning battle-feud, or dissension; and from *fe* or *fee*, which it is said signifies wages or pay for service, combined with *od* or *odh*, to which the signification of possession or property is assigned. But, as Sir Francis Palgrave has well remarked, 'upon all the Teutonic etymologies it is sufficient to observe, that the theories are contradicted by the *practice* of the Teutonic tongues—a *Fevd*, or fief, is not called by such a name, or by any name approaching thereto, in any Teutonic or Gothic language whatever.' (*Proofs and Illustrations to Rise and Progress of Eng. Com.*, p. ccvii.) *Lehn*, or some cognate form, is the only corresponding Teutonic term; *Laen* in Anglo-Saxon, *Len* in Danish, *Leen* in Swedish, &c. All these words properly signify the same thing that is expressed by our modern English form of the same element, *Loan*; a *loan* is the only name for a feud or fief in all the Teutonic tongues. What then is *feud* or *fief*? Palgrave doubts if the word *Feudum* ever existed. The true word seems to be *Fevdum* (not distinguishable from *Feudum* in old writing), or *feftum*. *Fiev* or *Fief* (Latinized into *Fevodum*, which some contracted into *Fevdum*, and others, by omitting the *v*, into *Feodum*) he conceives to be *Fitef*, or *Phitef*, and that again to be a colloquial abbreviation of *Emphyteusis*, pronounced *Emphytefsis*, a well known term of the Roman imperial law for an estate granted to be held not absolutely, but with the ownership still in the grantor and the usufruct only in the hands of the grantee. It is certain that emphyteusis was used in the middle ages as synonymous with Precaria (an estate held on a precarious or uncertain tenure); that precariæ, and also præstitæ, or præstariæ (literally loans), were the same with Beneficia; and that Beneficia under the emperors were the same or near the same as fiefs. [BENEFICIUM.] (See these positions also established in Palgrave, *ut supra*, cciv.—ccvi.) It may be added that the word *Feu* is still in familiar use in Scotland for an estate held only for a term of years. The possessor of such an estate is called a *Feuar*. Many of these feus are held for 99 years, some for 999 years. A rent, or feu-duty, as it is called, is always paid, as in the case of a lease in England; but, although never, we believe, merely nominal, it is often extremely trifling in proportion to the value of the property. In Erskine's 'Principles of the Law of Scotland,' in the section 'On the several kinds of Holding,' (book ii, tit. 4), we find the following passage respecting feu-holding, which may be taken as curiously illustrating the derivation of fief that has just been quoted from another writer:—'It has a strong resemblance to the Roman *Emphyteusis*, in the nature of the right, the yearly duty payable by the vassal, the penalty in the case of not punctual payment, and the restraint frequently laid upon vassals not to alien without the superior's consent.' As for the English term *Fee*, which is generally, if not universally assumed to be the same word with fief and feud (and of which it may be the abbreviated form, as we may infer from the words 'feoffor,' 'infeoff,' and 'feoffment'), it would be easy enough to show how, supposing that notion to be correct, it may have acquired the meaning which it has in the expressions fee-simple, fee-tail, &c.

The origin of the system of feuds has been a fertile subject of speculation and dispute. If we merely seek for the existence of a kind of landed tenure resembling that of the fief in its essential principle, it is probable that such may be discovered in various ages and parts of the world. But feuds alone are not the feudal system. They are only one of the elements out of which that system grew. In its entireness, it is certain that the feudal system never subsisted anywhere before it arose in the middle ages in those parts of Europe in which the Germanic nations settled themselves after the subversion of the Roman empire.

Supposing feud to be the same word with the Roman emphyteusis, it does not follow that the Germanic nations borrowed the notion of this species of tenure from the Romans. It is perhaps more probable that it was the common form of tenure among them before their settlement in the Roman provinces. It is to be observed that the emphyteusis, the precaria, the beneficium, only subsisted under the Roman scheme of polity in particular instances, but they present themselves as the very genius of the Germanic scheme. What was only occasional under the one became general under the other. In other words, if the Romans had feuds, it was their Germanic conquerors who first established a system of feuds. They probably established such a system upon their first settlement in the conquered provinces. The word feudum indeed is not found in any writing of earlier date than the beginning of the eleventh century, although, as Mr. Hallam has remarked, the words *feum* and *fevum*, which are evidently the same with feudum, occur in several charters of the preceding century. But, as we have shown, feudum or feud, in all probability, was not the Teutonic term. 'Can it be doubted,' asks Mr. Hallam, 'that some word of barbarous original must have answered, in the vernacular languages, to the Latin beneficium?' There is reason to believe, as we have seen, that this vernacular word must have been *Lehn*, or some cognate form, and that feud was merely a corrupted term of the Roman law which was latterly applied to denote the same thing.

We know so little with certainty respecting the original institutions of the Germanic nations, that it is impossible to say how much they may have brought with them from their northern forests, or how much they may have borrowed from the imperial polity, of the other chief element which enters into the system of feudalism, the connection subsisting between the grantor and the grantee of the fief, the person having the property and the person having the usufruct, or, as they were respectively designated, the suzerain or lord, and the tenant or vassal. Tenant may be considered as the name given to the latter in reference to the particular nature of his right over the land; vassal, that denoting the particular nature of his personal connexion with his lord. The former has been already explained; the consideration of the latter introduces a new view. By some writers the feudal vassals have been derived from the *comites*, or officers of the Roman imperial household [COUNT]; by others from the *comites*, or companions, mentioned by Tacitus (*German.* 13, &c.) as attending upon each of the German chiefs in war. The latter opinion is ingeniously maintained by Montesquieu (xxx. 3). One fact appears to be certain, and is of some

importance, namely, that the original vassali or vassi were merely noblemen who attached themselves to the court and to attendance upon the prince, without necessarily holding any landed estate or beneficium by royal grant. In this sense the words occur in the early part of the ninth century. Vassal has been derived from the Celtic *gwas*, and from the German *gesell*, which are probably the same word, and of both of which the original signification seems to be a helper, or subordinate associate, in labour of any kind.

If the vassal was at first merely the associate of or attendant upon his lord, nothing could be more natural than that, when the latter came to have land to give away, he should most frequently bestow it upon his vassals, both as a reward for their past and a bond by which he might secure their future services. If the peculiar form of tenure constituting the fief or fehu did not exist before, here was the very case which would suggest it. At all events, nothing could be more perfectly adapted to the circumstances. The vassal was entitled to a recompense; at the same time it was not the interest of the prince to sever their connexion, and to allow him to become independent; probably that was as little the desire of the vassal himself; he was conveniently and appropriately rewarded therefore by a fief, that is, by a loan of land, the profits of which were left to him as entirely as if he had obtained the ownership of the land, but his precarious and revocable tenure of which, at the same time, kept him bound to his lord in the same dependence as before.

Here then we have the union of the feud and vassalage—two things which remained intimately and inseparably combined so long as the feudal system existed. Nevertheless they would appear, as we have seen, to have been originally quite distinct, and merely to have been thrown into combination by circumstances. At first it is probable that, as there were vassals who were not feudatories, so there were feudatories who were not vassals. But very soon, when the advantage of the association of the two characters came to be perceived, it would be established as essential to the completeness of each. Every vassal would receive a fief, and every person to whom a fief was granted would become a vassal. Thus a vassal and the holder of a fief would come to signify, as they eventually did, one and the same thing.

Fiefs, as already intimated, are generally supposed to have been at first entirely precarious, that is to say, resumable at any time at the pleasure of the grantor. But if this state of things ever existed, it probably did not last long. Even from the first it is most probable that many fiefs were granted for a certain term of years or for life. And in those of all kinds a substitute for the original precariousness of the tenure was soon found, which while it equally secured the rights and interests of the lord, was much more honourable and in every way more advantageous for the vassal. This was the method of attaching him by certain oaths and solemn forms, which, besides their force in a religious point of view, were so contrived as to appeal also to men's moral feelings, and which therefore it was accounted not only impious but infamous to violate. The relation binding the vassal to his lord was made to wear all the appearance of a mutual interchange of benefits, —of bounty and protection on the one hand, of gratitude and service due on the other; and so strongly did this view of the matter take possession of men's minds, that in the feudal ages even the ties of natural relationship were looked upon as of inferior obligation to the artificial bond of vassalage.

As soon as the position of the vassal had thus been made stable and secure, various changes would gradually introduce themselves. The vassal would begin to have his fixed rights as well as his lord, the oath which he had taken measuring and determining both these rights and his duties. The relation between the two parties would cease to be one wholly of power and dominion on the one hand, and of mere obligation and dependence on the other. If the vassal performed that which he had sworn, nothing more would be required of him. Any attempt of his lord to force him to do more would be considered as an injustice. Their connexion would now assume the appearance of a mutual compact, imposing corresponding obligations upon both, and making protection as much a duty in the lord as gratitude and service in the vassal.

Other important changes would follow this fundamental change, or would take place while it was advancing to completion. After the fief had come to be generally held for life, the next step would be for the eldest son usually to succeed his father. His right so to succeed would next be established by usage. At a later stage fiefs became descendible in the collateral as well as in the direct line. At a still later, they became inheritable by females as well as by males. There is much difference of opinion, however, as to the dates at which these several changes took place. Some writers conceive that fiefs first became hereditary in France under Charlemagne; others, however, with whom Mr. Hallam agrees, maintain that there were hereditary fiefs under the first race of French kings. It is supposed not to have been till the time of the first Capets in the end of the tenth century that the right of the son to succeed the father was established by law in France. Conrad II., surnamed the Salic, who became emperor in 1024, is generally believed to have first established the hereditary character of fiefs in Germany.

Throughout the whole of this progressive development of the system, however, the original nature of the fief was never forgotten. The ultimate property was still held to be in the lord; and that fact was very distinctly signified, not only by the expressive language of forms and symbols, but by certain liabilities of the tenure that gave still sharper intimation of its true character. Even after fiefs became descendible to heirs in the most comprehensive sense, and by the most fixed rule, every new occupant of the estate had still to make solemn acknowledgment of his vassalage, and thus to obtain, as it were, a renewal of the grant from the lord. He became bound to discharge all services and other dues as fully as the first grantee had been. Above all, in certain circumstances, as, for example, if the tenant committed treason or felony, or if he left no heir, the estate would still return by forfeiture or escheat to the lord, as to its original owner.

Originally fiefs were granted only by sovereign princes; but after estates of this description, by acquiring the hereditary quality, came to be considered as property to all practical intents and purposes, their holders proceeded, on the strength of this completeness of possession, themselves to assume the character and to exercise the rights of lords, by the practice of what was called subinfeudation, that is, the alienation of portions of their fiefs to other parties, who thereupon were placed in the same or a similar relation to them as that in which they stood to the prince. The vassal of the prince became the lord over other vassals; in this latter capacity he was called a mesne (that is, an intermediate) lord; he was a lord and a vassal at the same time. In the same manner the vassal of a mesne lord might become also the lord of other arrere vassals, as those vassals that held of a mesne lord were designated. This process sometimes produced curious results; for a lord might in this way actually become the vassal of his own vassal, and a vassal lord over his own lord.

From whatever cause it may have happened (which is matter of dispute), in all the continental provinces of the Roman empire which were conquered and occupied by the Germanic nations, many lands were from the first held, not as fiefs, that is, with the ownership in one party and the usufruct in another, but as allodia, that is, in full and entire ownership. [ALLODIUM.] The holder of such an estate, having no lord, was of course free from all the exactions and burthens which were incidental to the vassalage of the holder of a fief. He was also, however, without the powerful protection which the latter enjoyed; and so important was this protection in the turbulent state of society which existed in Europe for some ages after the dissolution of the empire of Charlemagne, that in fact most of the allodialists in course of time exchanged their originally independent condition for the security and subjection of that of the feudatory. 'During the tenth and eleventh centuries,' says Mr. Hallam, 'it appears that allodial lands in France had chiefly become feudal; that is, they had been surrendered by their proprietors, and received back again upon the feudal conditions; or, more frequently perhaps the owner had been compelled to acknowledge himself the man or vassal of a suzerain, and thus to confess an original grant which had never existed. Changes of the same nature, though not perhaps so extensive or so distinctly to be traced, took place in Italy and Germany. Yet it would be inaccurate to assert that the prevalence of the feudal system has been unlimited; in a great part of France allodial tenures always subsisted, and many estates in the empire were of the same description.'

After the conquest of England by the Normans, the *dominium directum*, or property of all the land in the kingdom, appears to have been considered as vested in the crown. 'All the lands and tenements in England in the hands of subjects,' says Coke, 'are holden mediately or immediately of the king; for in the law of England we have not properly allodium.' This universality of its application therefore may be regarded as the first respect in which the system of feudalism established in England differed from that established in France and other continental countries. There were also various other differences. The Conqueror, for instance, introduced here the practice unknown on the continent of compelling the arrere vassals, as well as the immediate tenants of the crown, to take the oath of fealty to himself. In other countries a vassal only swore fealty to his immediate lord; in England, if he held of a mesne lord, he took two oaths, one to his lord and another to his lord's lord. It may be observed, however, that in those times in which the feudal principle was in its greatest vigour the fealty of a vassal to his immediate lord was usually considered as the higher obligation; when that and his fealty to the crown came into collision, the former was the oath to which he adhered. Some feudists indeed held that his allegiance to the crown was always to be understood as reserved in the fealty which a vassal swore to his lord; and the Emperor Frederic Barbarossa decreed that in every oath of fealty taken to an inferior lord there should be an express reservation of the vassal's duty to the emperor. But the double oath exacted by the Norman conqueror did not go so far as this. It only gave him at the most a concurrent power with the mesne lord over the vassals of the latter, who in France were nearly removed altogether from the control of the royal authority. A more important difference between the English and French feudalism consisted in the greater extension given by the former to the rights of lords generally over their vassals by what were called the incidents of wardship and marriage. The wardship or guardianship of the tenant during minority, which implied both the custody of his person and the appropriation of the profits of the estate, appears to have been enjoyed by the lord in some parts of Germany, but no where else except in England and Normandy. 'This,' observes Mr. Hallam, 'was one of the most vexatious parts of our feudal tenures, and was never perhaps more sorely felt than in their last stage under the Tudor and Stuart families.' The right of marriage (maritagium) originally implied only the power possessed by the lord of tendering a husband to his female ward while under age: if she rejected the match, she forfeited the value of the marriage; that is, as much as any one would give to the lord for permission to marry her. But the right was afterwards extended so as to include male as well as female heirs; and it also appears that although the practice might not be sanctioned by the law, some of the Anglo-Norman kings were accustomed to exact penalties from their female vassals of all ages, and even from widows, for either marrying without their consent or refusing such marriages as they proposed. The seignorial prerogative of marriage, like that of wardship, was peculiar to England and Normandy, and to some parts of Germany.

It has been very usual to represent military service as the essential peculiarity of a feudal tenure. But the constituent and distinguishing element of that form of tenure was its being a tenancy merely, and not an ownership; the enjoyment of land for certain services to be performed. In the state of society however in which the feudal system grew up, it was impossible that military service should not become the chief duty to which the vassal was bound. It was in such a state of society the most important service which he could render to his lord. It was the species of service which the persons to whom fiefs were first granted seem to have been previously accustomed to render, and the continuance of which accordingly the grant of the fief was chiefly intended to secure. Yet military service, or knight service, as it was called in this country, though the usual, was by no means the necessary or uniform condition on which fiefs were granted. Any other honourable condition might be imposed which distinctly recognized the *dominium directum* of the lord. [KNIGHT-SERVICE.]

Another common characteristic of fiefs, which in like manner arose incidentally out of the circumstances of the times in which they originated, was that they usually consisted of land. Land was in those times nearly the only species of wealth that existed; certainly the only form of wealth that had any considerable security or permanency. Yet there are not wanting instances of other things, such as pensions and offices, being granted as fiefs. It was a great question nevertheless among the feudists whether a fief could consist of money, or of any thing else than land; and perhaps the most eminent authorities have maintained that it could not. The preference thus shown for land by the spirit of the feudal customs has perhaps left deeper traces both upon the law, the political constitution, and the social habits and feelings of our own and other feudal countries than any other part of the system. We have thence derived not only the marked distinction (nearly altogether unknown to the civil law) by which our law still discriminates certain amounts of interest in lands and tenements under the name of *real* property from property of every other kind, but also the ascendency retained by the former in nearly every respect in which such ascendency can be upheld either by institutions or by opinion.

The grant of land as a fief, especially when it was a grant from the suzerain, or supreme lord, whether called king or duke, or any other name, was, sometimes at least, accompanied with an express grant of jurisdiction. Thus every great tenant exercised a jurisdiction civil and criminal over his immediate tenants: he held courts and administered the laws within his lordship like a sovereign prince. It appears that the same jurisdiction was often granted by the crown to the abbeys with their lands. The formation of MANORS in this country appears to have been consequent upon the establishment of feudalism. The existence of manor-courts, and so many small jurisdictions within the kingdom, is one of the most permanent features of that polity which the Normans stamped upon this country.

In the infancy of the feudal system it is probable that the vassal was considered bound to attend his lord in war for any length of time during which his services might be required. Afterwards, when the situation of the vassal became more independent, the amount of this kind of service was fixed either by law or by usage. In England the whole country was divided into about 60,000 knights' fees; and the tenant of each of these appears to have been obliged to keep the field at his own expense for forty days on every occasion on which his lord chose to call upon him. For smaller quantities of land proportionately shorter terms of service were due: at least such is the common statement; although it seems improbable that the individuals composing a feudal army could thus have the privilege of returning home some at one time, some at another. Women were obliged to send their substitutes; and so were the clergy, certain persons holding public offices, and men past the age of sixty, all of whom were exempted from personal service. The rule or custom however both as to the duration of the service, and its extent in other respects, varied greatly in different ages and countries.

The other duties of the vassal were rather expressive of the relation of honourable subordination in which he stood to his lord than services of any real or calculable value. They are thus summed up by Mr. Hallam:—'It was a breach of faith to divulge the lord's counsel, to conceal from him the machinations of others, to injure his person or fortune, or to violate the sanctity of his roof and the honour of his family. In battle he was bound to lend his horse to his lord when dismounted; to adhere to his side while fighting, and to go into captivity as a hostage for him when taken. His attendance was due to the lord's courts, sometimes to witness and sometimes to bear a part in the administration of justice.'

There were however various other substantial advantages derived by the lord. We have already mentioned the rights of wardship and of marriage, which were nearly peculiar to the dominions of the English crown. Besides these, there were the payment, called a relief, made by every new entrant upon the possession of the fief, the escheat of the land to the lord when the tenant left no heir, and its forfeiture to him when the tenant was found guilty either of a breach of his oath of fealty, or of felony. There was besides a fine payable to the lord upon the alienation by the tenant of any part of the estate, if that was at all permitted. Finally, there were the various aids, as they were called, payable by the tenant. 'These,' observes Mr. Hallam, 'depended a great deal upon local custom, and were often extorted unreasonably. Du Cange mentions several as having existed in France; such as an

aid for the lord's expedition to the Holy Land, for marrying his sister or eldest son, and for paying a relief to his suzerain on taking possession of his land. Of these the last appears to have been the most usual in England. But this and other aids occasionally exacted by the lords were felt as a severe grievance; and by Magna Charta three only are retained—to make the lord's eldest son a knight, to marry his eldest daughter, and to redeem his person from prison. They were restricted to nearly the same description by a law of William I. of Sicily, and by the customs of France. These feudal aids are deserving of our attention as the beginnings of taxation, of which for a long time they in a great measure answered the purpose, till the craving necessities and covetous policy of kings substituted for them more durable and onerous burthens.'

The principal ceremonies used in conferring a fief were homage, fealty, and investiture. The two first of these cannot be more distinctly or more shortly described than in the words of Littleton: 'Homage,' says the Treatise of Tenures, 'is the most honourable service, and most humble service of reverence, that a frank tenant may do to his lord: for when the tenant shall make homage to his lord, he shall be ungirt and his head uncovered, and his lord shall sit and the tenant shall kneel before him on both his knees, and hold his hands jointly together between the hands of his lord, and shall say thus: I become your man, from this day forward, of life and limb, and of earthly worship, and unto you shall be true and faithful, and bear you faith for the tenements that I claim to hold of you, saving the faith that I owe to our sovereign lord the king; and then the lord, so sitting, shall kiss him.' Religious persons and women instead of 'I become your man,' said 'I do homage unto you.' Here it is to be observed there was no oath taken; the doing of fealty consisted wholly in taking an oath, without any obeisance. 'When a freeholder (frank tenant),' says Littleton, 'doth fealty to his lord, he shall hold his right hand upon a book, and shall say thus: Know ye this, my lord, that I shall be faithful and true unto you, and faith to you shall bear for the lands which I claim to hold of you, and that I shall lawfully do to you the customs and services which I ought to do at the terms assigned, so help me God and his saints; and he shall kiss the book. But he shall not kneel when he maketh his fealty, nor shall make such (that is, any such, *tiel,*) humble reverence as is aforesaid in homage.' 'Investiture or the actual conveyance of feudal lands,' says Mr. Hallam, 'was of two kinds; proper and improper. The first was an actual putting in possession upon the ground, either by the lord or his deputy; which is called in our law livery of seisin. The second was symbolical, and consisted in the delivery of a turf, a stone, a wand, a branch, or whatever else might have been made usual by the caprice of local custom. Du Cange enumerates not less than 98 varieties of investitures.' The present mode of conveying lands by feoffment is in fact the feudal investiture. [FEOFFMENT.]

The feudal system may be regarded as having nearly reached its maturity and full development when the Norman conquest of England took place in the middle of the 11th century. It appears accordingly to have been established here immediately or very soon after that event in as pure, strict, and comprehensive a form as it ever attained in any other country. The whole land of the kingdom, as we have already mentioned, was without any exception either in the hands of the crown, or held in fief by the vassals of the crown, or of them by sub-infeudation. Those lands which the king kept were called his demesne (the Terræ Regis of the Domesday Survey), and thus the crown had a number of immediate tenants, like any other lord, in the various lands reserved in nearly every part of the kingdom. No where else, also, before the restrictions established by the charters, were the rights of the lord over the vassal stretched in practice nearer to their extreme theoretical limits. On the other hand, the vassal had arrived at what we may call his ultimate position in the natural progress of the system; the hereditary quality of feuds was fully established; his antient absolute dependence and subjection had passed away; under whatever disadvantages his inferiority of station might place him, he met his lord on the common ground of their mutual rights and obligations; there might be considerable contention about what these rights and obligations on either side were, but it was admitted that on both sides they had the same character of real, legally binding obligations, and legally maintainable rights.

This settlement of the system however was anything rather than an assurance of its stability and permanency. It was now held together by a principle altogether of a different kind from that which had originally created and cemented it. That which had been in the beginning the very life of the relation between the lord and the vassal had now in great part perished. The feeling of gratitude could no more survive than the feeling of dependence on the part of the latter after feuds became hereditary. A species of superstition, indeed, and a sense of honour, which in some degree supplied the place of what was lost, were preserved by oaths and ceremonies, and the influence of habit and old opinion; but these were at the best only extraneous props; the self-sustaining strength of the edifice was gone. Thus it was the tendency of feudalism to decay and fall to pieces under the necessary development of its own principle.

Other causes called into action by the progress of events conspired to bring about the same result. The very military spirit which was fostered by the feudal institutions, and the wars, defensive and aggressive, which they were intended to supply the means of carrying on, led in course of time to the release of the vassal from the chief and most distinguishing of his original obligations, and thereby, it may be said, to the rupture of the strongest bond that had attached him to his lord. The feudal military army was at length found so inconvenient a force that soon after the accession of Henry II. the personal service of vassals was dispensed with, and a pecuniary payment, under the name of escuage, accepted in its stead. From this time the vassal was no longer really the defender of his lord; he was no longer what he professed to be in his homage and his oath of fealty; and one effect of the change must have been still farther to wear down what remained of the old impressiveness of these solemnities, and to reduce them nearer to mere dead forms. The acquisition by the crown of an army of subservient mercenaries, in exchange for its former inefficient and withal turbulent and unmanageable army of vassals, was in fact the discovery of a substitute for the main purpose of the feudal polity. Whatever nourished a new power in the commonwealth, also, took sustenance and strength from this ancient power. Such must in an especial degree have been the effect of the growth of towns, and of the new species of wealth, and, it may be added, the new manners and modes of thinking, created by trade and commerce.

The progress of sub-infeudation has sometimes been represented as having upon the whole tended to weaken and loosen the fabric of feudalism. It 'demolished,' observes Blackstone (ii. 4), 'the antient simplicity of feuds; and an inroad being once made upon their constitution, it subjected them in a course of time to great varieties and innovations. Feuds began to be bought and sold, and deviations were made from the old fundamental rules of tenure and succession, which were held no longer sacred when the feuds themselves no longer continued to be purely military.' But the practice of sub-infeudation would rather seem to have been calculated to carry out the feudal principle, and to place the whole system on a broader and firmer basis. It would be more correct to ascribe the effects here spoken of to the prohibition against sub-infeudation. The effect of this practice, it is true, was to deprive the lord of his forfeitures and escheats and the other advantages of his seigniory, and various attempts therefore were at length made to check or altogether prevent it, in which the crown and the tenants in chief, whose interests were most affected, may be supposed to have joined. One of the clauses of the great charter of Henry III. (the thirty-second) appears to be intended to restrict sub-infeudation (although the meaning is not quite clear), and it is expressly forbidden by the statute of Quia Emptores (the 18 Ed. I. c. 1). This however was originally the only way in which the holder of a fief could alienate any part of his estate without the consent of his lord; and it therefore now became necessary to provide some other mode of effecting that object, for it seems to have been felt that after alienation had been allowed so long to go on under the guise of sub-infeudation, to restrain it altogether would be no longer possible. The consequence was, that, as a compensation for the prohibition of sub-infeudation, the old prohibition against alienation was removed; lands were allowed to be alienated, but the purchaser or grantee did not hold them of the vendor or grantor, but held them exactly as the grantor did; and such is still the legal effect in Eng-

land when a man parts with his entire interest in his lands. This change was effected by the statute of Quia Emptores with regard to all persons except the immediate tenants of the crown, who were permitted to alienate on paying a fine to the king by the statute 1 Edw. III. c. 12. Thus at the same time that a practice strictly accordant to the spirit of feudalism, and eminently favourable to its conservation and extension, was stopped, another practice, altogether adverse to its fundamental principles, was introduced and established, that of allowing *voluntary* alienation by persons during their lifetime.

It was a consequence of feudal principles, that a man's lands could not be subjected to the claims of his creditors. This restraint upon what may be called *involuntary* alienation has been in a great degree removed by the successive enactments which have had for their object to make a man's lands liable for his debts; although, after a lapse of near six hundred years since the statute of Acton Burnell, the lands of a debtor are not yet completely subjected to the just demands of his creditors. This statute of Acton Burnell, passed 11 Ed. I. (1283), made the devisable burgages, or burgh tenements, of a debtor saleable in discharge of his debts. By the Statute of Merchant, passed 13 Ed. I. (1285), called Statute 3, a debtor's lands might be delivered to his merchant creditor till his debt was wholly paid out of the profits. By the 18th chapter of the Statute of Westminster the Second, passed the same year, a moiety of a debtor's land was subjected to execution for debts recovered by judgment [ELEGIT]; and finally, by the several modern statutes of bankruptcy, the whole of a bankrupt debtor's lands have become absolutely saleable for the payment of his debts. Further, by a recent act (3 and 4 Wm IV. c. 104), all a deceased person's estate in land, of whatever kind, whether he was a trader within the bankrupt laws or not, is liable to the payment of his debts, both those on specialty and those on simple contract.

An attempt had early been made to restore in part the old restraints upon *voluntary* alienation by the statute 13 Ed. I. c. 1, entitled 'De Donis Conditionalibus,' which had for its object to enable any owner of an estate, by his own disposition, to secure its descent in perpetuity in a particular line. So far as the statute went, it was an effort to strengthen the declining power of feudalism. The effect was to create what were called estates tail, and to free the tenant in tail from many liabilities of his ancestor to which he would be subject if he were seized of the same lands in fee-simple. [ESTATE.] The power which was thus conferred upon landholders of preventing the alienation of their lands remained in full force for nearly two centuries, till at last, in the reign of Edward IV., by the decision of the courts (A. D. 1472) the practice of barring estates tail by a common recovery was completely established. [RECOVERY, COMMON.]

The practice of conveying estates by fine, which was of great antiquity in England, and the origin of which is by some referred to the time of Stephen or Henry II., was regulated by various statutes (among others, particularly by the 4 Henry VII.), and contributed materially to facilitate the transfer of lands in general, but more particularly (as regulated by the statute just mentioned) to bar estates tail. [FINE.] By a statute passed in the 32 Henry VIII. c. 28, tenants in tail were enabled to make leases for three lives or twenty-one years, which should bind their issue. The 26 Hen. VIII. c. 13, also, had declared all estates of inheritance, in use or possession, to be forfeited to the king upon any conviction of high treason, and thus destroyed one of the strongest inducements to the tying up of estates in tail, which hitherto had only been forfeitable for treason during the life of the tenant in tail.

Another mode by which the feudal restraints upon *voluntary* alienation came at length to be extensively evaded was the practice introduced, probably about the end of the reign of Edward III., of granting lands to persons to *uses*, as it was termed; that is, the new owner of the land received it not for his own use, but on the understanding and confidence that he would hold the land for such persons and for such purposes as the grantor then named or might at any time afterwards name. Thus an estate in land became divided into two parts, one of which was the legal ownership, and the other the right to the profits or the *use*; and this use could be transferred by a man's last *will* at a time when, the land itself being still bound in the fetters of feudal restraint, could not be transferred by will, except where it was devisable, as in Kent and some other parts of England, by special custom. The person who thus obtained the use or profits of the estate—the *Cestui que use*, as he is called in law—was finally converted into the actual owner of the land to the same amount of interest as he had in the use (A.D. 1535) by the statute of uses (the 27 Hen. VIII. c. 10), and thus the power of devising land which had been enjoyed by the mode of uses was taken away. But this important element in the feudal system, the restraint on the disposition of lands by will, could no longer be maintained consistently with the habits and opinions then established, and accordingly, by stat. 32 Hen. VIII. (which was afterwards explained by the stat. 34 Hen. VIII.), all persons were allowed to dispose of their freehold lands held in fee-simple by a will in writing, subject to certain restrictions as to lands held by knight service either of the king or any other, which restrictions were removed by the stat. 12 Chas. II. c. 24, which abolished military tenures. [USES.]

Notwithstanding these successive assaults upon certain parts of the antient feudalism, the main body of the edifice still remained almost entire. It is said that the subject of the abolition of military tenures was brought before the parliament in the 18th of James I., on the king's recommendation, but at that time nothing was done in the matter. When the civil war broke out in 1641, the profits of marriage, wardship, and of most of the other old feudal prerogatives of the crown, were for some time still collected by the parliament, as they had formerly been by the king. The fabric of the feudal system in England however was eventually shattered by the storm of the Great Rebellion. The Court of Wards was in effect discontinued from 1645. The restoration of the king could not restore what had thus been in practice swept away. By the above-mentioned statute, 12 Car. II. c. 24, it was accordingly enacted that from the year 1645 the Court of Wards and Liveries, and all wardships, liveries, primer-seisins, values, and forfeitures of marriage, &c., by reason of any tenure of the king's majesty, or of any other by knights' tenures, were taken away and discharged, together with all fines for alienations, tenure by homage, escuage, aids pur file marrier and pur fair fitz chevalier, &c.; and that all tenures of any honours, manors, lands, tenements or hereditaments, or any estate of inheritance at the common law, held either of the king or of any other person or persons, bodies politic or corporate, were turned into free and common soccage, to all intents and purposes. [SOCCAGE.] By the same statute every father was empowered by deed or will, executed in the presence of two witnesses, to appoint persons to have the guardianship of his infant and unmarried children, and to have the custody and management of their property. It was not till after the lapse of nearly another century that the tenures and other institutions of feudalism were put an end to in Scotland by the statutes, passed after the Rebellion, of the 20 Geo. II. c. 43, entitled 'An Act for abolishing Heretable Jurisdictions;' and the 20 Geo. II. c. 50, entitled 'An Act for taking away the Tenure of Wardholding in Scotland, for giving to heirs and successors a summary process against superiors, and for ascertaining the services of all tenants, &c.' Nor have estates-tail in Scotland yet been relieved from the strictest fetters of a destination in perpetuity, either by the invention of common recoveries, or by levying a fine, or by any legislative enactment.

We have enumerated the principal statutes which may be considered as having broken in upon the integrity of the feudal system, considered in reference to the power which the *tenant* of land can now exercise over it, and the right which others can enforce against him in respect of his property in it. But the system of tenures still exists. The statute of Charles II. only abolished military tenures and such parts of the feudal system as had become generally intolerable; but all lands in the kingdom are still held either by soccage tenure, into which military tenures were changed, or else by the respective tenures of frankalmoyne, grand serjeanty, and copyhold, which were not affected by the statute.

Some of the consequences of tenures, as they at present subsist, cannot be more simply exemplified than by the rules as to the FORFEITURE and ESCHEAT of lands, both of which however have undergone modifications since the statute of Charles II.

To attain a comprehensive and exact view of the present tenures of landed property in England and their incidents and consequences, it would be necessary for the reader to

enter upon a course of study more laborious and extensive than is consistent with pursuits not strictly legal. Still a general notion may be acquired of their leading characteristics by referring to several of the articles already quoted, and to such heads as ATTAINDER, BARON, COPYHOLD, COURTS, DISTRESS, ESTATE, LEASE, MANOR, TENURES, and such other articles as may be referred to in those last mentioned.

The notions of loyalty, of honour, of nobility, and of the importance, socially and politically, of landed over other property, are the most striking of the feelings which may be considered to have taken their birth from the feudal system. These notions are opposed to the tendency of the commercial and manufacturing spirit which has been the great moving power of the world since the decline of strict feudalism; but that power has not yet been able to destroy, or perhaps even very materially to weaken the opinions above mentioned in the minds of the mass.

We are not however to pass judgment upon feudalism, as the originating and shaping principle of a particular form into which human society has run, simply according to our estimate of the value of these its relics at the present day. The true question is, if this particular organization had not been given to European society after the dissolution of the antient civilization, what other order of things would in all likelihood have arisen, a better or a worse than that which did result? Some assistance in settling this question might perhaps be obtained by comparing the history of society, from this date, in the feudal countries, with its history in those parts of Europe to which feudalism never reached;—France or England, for instance, with Denmark, Sweden, or Hungary.

As for the state of society during the actual prevalence of the feudal system, it was without doubt in many respects exceedingly defective and barbarous. But the system, with all its imperfections, still combined the two essential qualities of being both a system of stability and a system of progression. It did not fall to pieces, neither did it stand still. Notwithstanding all its rudeness, it was, what every right system of polity is, at once conservative and productive. And perhaps it is to be most fairly appreciated by being considered, not in what it actually was, but in what it preserved from destruction, and in what it has produced.

The earliest published compilation of feudal law was a collection of rules and opinions supposed to have been made by two lawyers of Lombardy, Obertus of Otto and Gerardus Niger, by order of the emperor Frederic Barbarossa. It appeared at Milan about the year 1170, and immediately became the great text book of this branch of the law in all the schools and universities, and even a sort of authority in the courts. It is divided in some editions into three, in others into five books, and is commonly entitled the 'Libri Feudorum;' the old writers however are wont to quote it simply as the Textus, or Text. But the great sources of the feudal law are the antient codes of the several Germanic nations; the capitularies or collections of edicts of Charlemagne and his successors; and the various Coutumiers or collections of the old customs of the different provinces of France. The laws of the Visigoths, of the Burgundians, the Salic law, the laws of the Alemanni, of the Baiuvarii, of the Ripuarii, of the Saxons, of the Anglii, of the Werini, of the Frisians, of the Lombards, &c. have been published by Lindenbrogius in his *Codex Legum Antiquarum*, fol. Francof., 1613. The best editions of the capitularies are that by Baluze, in 2 vols. fol., Paris, 1677, and that by Chiniac, of which, however, we believe only the two first volumes have appeared, Paris, fol., 1780. Richebourg's *Nouveau Coutumier Général*, 4 vols. fol., Paris, 1724, is a complete collection of the Coutumiers, all of which however have also been published separately. All these old laws and codes, as well as the Milan text-book, have been made the subject of voluminous commentaries.

FEUERBACH, PAUL JOHANN ANSELM, the most celebrated German writer on criminal law, was born at Frankfort on the Mayn, May 14th, 1775. After having studied at Jena, he gave lectures there on law in 1798, and became successively professor at the universities of Giessen, Jena, Kiel, and Landshuth. While he was a lecturer at Jena he published his 'Anti-Hobbes, or on the Limits of Civil Power, and on the compulsory Right of Subjects against their Sovereigns' (Anti-Hobbes oder über die grenzen der bürgerlichen gewalt und das zwangrecht der unterthanen gegen ihren oberherrn); and a number of essays inserted in the 'Magazine of Criminal Jurisprudence.' But the work which established his fame was his 'Review of the fundamental Principles and fundamental Ideas of Penal Law,' which appeared shortly afterwards. His 'Critique of the project of a Penal Law for Bavaria,' published in 1804, is another remarkable work. These purely theoretical essays exercised a very considerable influence on the criminal legislation of Germany, and were soon followed by practical effects. Almost immediately on the publication of the last-mentioned work, and while he was professor at Landshuth, the Bavarian government entrusted him with drawing up a project of a criminal code for the kingdom, which, after having been submitted to a commission, was adopted, with very few modifications. The principles previously promulgated by Feuerbach were all incorporated in this project, which is characterised by logical connection, strict definitions, complete development of the principle of penal law, correct generalization and specification of crimes and misdemeanours, and precise determination of penalties. Its consequences were immense, for previously to its publication criminal jurisprudence in Germany was most deplorable. Its excellence both in substance and form was such, that it was adopted as the basis of similar attempts at a reform of criminal law by other portions of Germany and Switzerland. Saxony, Wirtemberg, Hanover, Oldenburg and Weimar, and the cantons Zürich, St. Gall, Basle and the Grisons modified their codes in accordance with it. In 1808 Feuerbach was created privy councillor, and received a commission to adapt the Code Napoleon to the wants of Bavaria; the result of his labour however was not adopted.—That criminal law has become a science, and that this science has had a great influence on legislation all over the continent, is to be mainly attributed to this gifted man. Criminal law, which had been harsh and bloody became humane: liberty of action was substituted for previous restraint, and the conditions were pointed out under which the state ought to interfere by penalties with the rights of the citizens. The former arbitrary power of the judges was circumscribed; deep-rooted and vague notions gave way to the inflexible but necessary bounds of law. If, on the one hand, it must be admitted that Feuerbach, by his philosophical inquiries and liberal conceptions, powerfully influenced the elements and principles of modern criminal law, it is to be regretted, on the other hand, that by his subsequent publication, 'Considerations on the Jury,' he has promulgated singular opinions on the spirit and efficacy of that institution. The leading idea of this work consists in the proposition that the verdict of the jury is insufficient to establish the legal evidence of crime. After having been assailed by a number of eminent writers, and in particular by Grolman, Feuerbach modified his opinions on the jury in 1821, during a visit to France, Belgium, and the Rhenish provinces, on a mission from the Bavarian government to investigate the legal institutions of those countries. On his return he published the result of his inquiries in his 'Reflections on the judicial Organization and Proceedings in France,' a work remarkable for the sagacity with which he lays open the deficiencies and inconveniences of all the French civil and penal legislation. A very able part of that work is the comparison of the French and English juries, which is entirely in favour of the latter, as, according to Feuerbach's opinion, the principles of that institution are completely perverted in France by the rules laid down during the empire for the composition of the jury. Like Berenger, Dupin, and other French writers who have exposed the faults of the existing mode of criminal proceedings in France, Feuerbach has stigmatised the French jurymen by calling them the twelve commissioners of government. Notwithstanding he had altered his opinion on the jury generally, and although by his remarks on the English jury in particular he seems to have made amends for his former animosity against it, he still retained some prejudices against that institution, on account of its being fraught with too many democratic principles. This tendency of Feuerbach's opinion had a very unfavourable influence on the Bavarian government when the introduction of that institution came under consideration, and ultimately it was the cause of the jury not being granted to the country. This circumstance proves that although a liberal legislator he was by no means in favour of democracy. In 1817 he was made second president of the court of appeal at Bamberg, and in 1821 he was nominated first president of the court of appeal at Anspach; to these functions his sphere of action was latterly entirely confined, with the exception of opinions given in important

civil and criminal cases. One of those was the notorious affair of Kaspar Hauser, which produced so much sensation all through Europe. With his wonted and acknowledged perspicuity he has investigated this revolting case, and has recorded the results of his inquiry in his last work, 'Kaspar Hauser, an instance of a psychological crime.' The two following passages of that book seem to implicate a reigning family of the south of Germany. Those passages are:—1. 'There are spheres of human society which are inaccessible to the arm of justice.' 2. Those spheres are defined as 'golden *castles*, the entrance of which is guarded by giants who do not allow a ray of light to penetrate.' A rumour prevails that his sudden death at Frankfort, in May, 1833, is not unconnected with that mysterious affair, the veil of which appears to have been lifted by him. His connection with the Bavarian government became in latter years very disagreeable in consequence of his decided opposition to its illiberal policy. Feuerbach was a man of polite acquirements as well as of professional eminence. The elegant diction of his productions has powerfully contributed to improve the style of recent German writers on law. In this respect his 'Exposition of remarkable Criminal Cases, founded upon documents,' merits particular mention. Previously to Feuerbach's time all similar essays were heavy and uninteresting, in consequence of all the documents being accumulated in their original uncouth form, without order or regard to the really interesting features of the case, namely the development of psychological considerations. It was he who first united to professional soundness of exposition elegant and convincing diction. This work, which is written with true poetical talent, is a remarkable specimen of investigation into the human heart, rendered still more striking by the most delicate and humane estimation of actions; it may be considered at once a model of exhaustive inquiry and a book of morals. In bold and vivid language he has promulgated the doctrine that it is impossible perfectly to harmonize the inflexible universality of law with individual culpability, and that it therefore is an unavoidable necessity, in particular cases, to modify and soften the sentence of the law by the prerogative of the sovereign.

FEVER, CONTINUED. It has been already stated that febrile diseases are divided into three great classes, according to the persistence or non-persistence of the morbid phenomena. [AGUE.] Of these classes the first includes the Fevers called Intermittent, in which the morbid phenomena, after having continued a certain time, disappear, but after an interval of a certain duration again recur, this alternate recurrence and remission taking place many times. In the second class the febrile phenomena do not wholly disappear, but merely diminish in violence; do not intermit, but remit: these constitute Remittent Fevers. In the third class there is neither any intermission nor remission of the febrile state, but a constant and uninterrupted progression of the disease to a certain termination; fevers in which the phenomena are thus uninterruptedly continuous, constitute the class of Continued Fevers.

Since the concurrence and succession of phenomena which constitute a paroxysm of intermittent fever, or an attack of ague, afford a paradigm, or example, of the febrile state in general, of course the individual phenomena which take place in an attack of continued fever must be essentially the same as those which have been already described under AGUE. There are however some modifications which require attention.

We may take, for the convenience of describing the condition of the system in the state of continued fever, the ordinary continued fever of this country, the disease denominated Common Continued Fever (Synochus Mitior). The phenomena which take place in this disease, and the order in which they succeed each other, are the following:—

The first event in the series is the derangement of the functions of the nervous system. There is reason to believe that this derangement takes place primarily in the organic system of nerves, that system which presides over the nutrition of the organs, and consequently that the very first effect of the noxious agent, whatever it be, which produces fever, is to disorder the health of the organs, and thereby to impair their energy.

Though it is probable that a disorder of the organic nerves is the first event that actually takes place in fevers, yet the first event of which we become conscious would seem to be a derangement in the second portion of the nervous system, the great nervous centres in which sensation, intellectual operation, and voluntary motion, have their seat, namely, the brain and spinal cord. The organic functions being carried on without consciousness, we can know that they are disordered only by their producing disturbance in some part of the sentient system. The organic portion of the nervous system is most intimately connected with the sentient portion, and any disorder of the former is quickly extended to the latter. In an attack of fever the disordered condition of the brain is indicated by a loss of mental energy. But this loss of mental energy, though it is probably the very first indication of fever of which any one can be conscious, is by no means the first symptom which usually attracts attention. In general the loss of mental power is not observed until it becomes distressing, which does not often happen until the progress of the disease is further advanced. The loss of mental power is indicated by the inability to perceive clearly the trains of ideas, and to attend closely to their relation; whence result indistinctness and confusion of mind, and the want of capacity to form a sound judgment.

As this state of the mind depends on the disordered condition of the organ in which the mind has its seat, the brain, and as the servant of the mind, volition, has its seat in the same portion of the nervous system: closely connected with this mental weakness, is the loss of energy in the muscles of voluntary motion. Lassitude is the result. The movements of the body are feeble and unsteady, as the energy of the mind is impaired.

From this morbid condition of the brain and of the muscles of voluntary motion, there results an uneasy sensation, of which no idea can be conveyed by words; it must be felt to be understood. It is not pain, it is more distressing than pain; even the mere restlessness which accompanies, and which forms so large a part of it, any one would gladly exchange for intense pain: it is this state which has been appropriately and expressively named 'Febrile Uneasiness.'

But very soon there is superadded to this uneasy sensation positive pain. In general pain is first felt in the back and loins, and in the limbs. It is rare that this symptom is absent in the commencement of this form of fever, and it often occasions more distress to the patient than anything else during the first stage of the disease.

The remaining part of the history of an attack of common continued fever has been thus given by a physician who has had the most abundant opportunities of witnessing the progress of the disease:—

'Already a remarkable change is commonly visible in the countenance. Its expression is that of dejection; it is often strikingly similar to that of a very weak person suffering from fatigue. The colour of the face is pallid, and the features are somewhat shrunk; but its general aspect is so peculiar and characteristic, that an experienced eye can distinguish the disease, even at this early period, and without asking a single question. The skin partakes in a remarkable degree of the debility which so early shows itself in the muscles of locomotion. This is indicated in a striking manner by its increasing sensitiveness to the physical agents by which it is surrounded, and by its inability to resist their influence. Ordinary degrees of temperature produce a sensation of cold which is sometimes intolerable; chilliness is felt even in a heated room, or in a warm bed: hence the sensation of cold, sometimes increasing to shivering, which has been considered one of the most constant signs of fever. But this feeling of chilliness by no means depends on external temperature: it is increased by cold, but it exists in spite of an elevated temperature; it arises from an internal cause, and is not to be counteracted by external heat.

While the patient experiences the sensation of cold, there is no diminution of the quantity of caloric in the system. The thermometer applied to any part of the body commonly rises as high as in the state of health; and the skin, touched by the hand of another person, communicates not the feeling of cold, but often, on the contrary, that of preternatural heat. There is no positive abstraction of caloric from the body, nor any failure in the process, whatever it be, by which animal heat is generated: there is only altered sensation, in consequence of derangement in the function of the skin. In this form of fever the chilliness in many cases never amounts to shivering; in others there is an attack of well-

marked rigor, and in others, again, there is either no feeling of cold, or it is so slight that it escapes observation.

The symptoms now enumerated are all clearly referrible to derangement of the function of the spinal cord and brain. There is as yet no affection of any other organ obviously or at least much developed. The circulating system, it is true, is just beginning to be affected. The pulse is no longer perfectly natural; it is more languid than in the state of health; sometimes it is also quicker; at other times it is slower; now and then it is scarcely changed in frequency, but its action is invariably weaker than in its sound state.

At the same time the respiration is affected in a corresponding degree; it is shorter and quicker than natural; the chest does not expand so freely, and compensation seems to be sought in an additional number of respirations. Oftentimes neither the pulse nor the respiration appears to be much altered, if the patient remain perfectly still; but if he rise and walk across the room the pulse instantly becomes rapid, and the respiration is quickened almost to fainting.

The transition from the affection of the nervous and sensorial to that of the circulating and the respiratory systems is thus clear and striking. Physiology teaches us how closely these systems are connected, and how mutually they are dependant one upon the other, the closest observers and the ablest experimentalists candidly confessing that they are scarcely able to determine which is the least dependant, or the action of which is the least necessary to the other's performance of its functions. The nervous system being first deranged, it is thus consonant to what we know of the healthy function of the animal economy that the circulating and the respiratory systems should be the next to suffer.

How long the nervous system may continue thus deranged before any other organs are involved, excepting the circulating and the respiratory, to the extent just stated, is uncertain. There can be no doubt that in this mild form of fever the range of the duration of this isolated state of disorder, if we may so express it, is from a few hours to several days. The rapidity or the slowness with which other systems of organs become involved seems to depend very much upon the acuteness of the attack. In general, the more acute the fever, the more rapidly the individual phenomena succeed each other, and the entire series becomes complete. But this is not, and it is important to bear in mind that it is not, invariably the case, for experience teaches us that the severity and danger of the disease are not diminished by the slowness of its approach; and that cases occur which are slow in forming, and which do not for a while excite alarm, that ultimately become truly formidable.

It has been stated that the circulation languishes with the diminished energy in the sensorial faculties, and the loss of power in the muscles of locomotion. After a while the pulse, which was feebler than natural, becomes more full, more strong, and generally more quick than in a sound state; and now the skin, which was cold, becomes preternaturally hot. The previous cold consisted, for the most part, of altered sensation, there being little or no loss of caloric; but the feeling of heat, on the contrary, is the result of an actual increase of temperature: for the heat in the interior of the body, as well as on the surface, rises in some cases several degrees, as is ascertained by the thermometer, the range of increase being from the natural standard 98° to 105°, beyond which it is seldom found to augment in this form of fever. The heat is at first not uniform over the entire surface of the body: it often happens that some parts are cold while others are burning hot. The heat is oftentimes particularly intense over the forehead or over the back part of the head, or over the whole scalp, while the cheeks are commonly flushed. All these symptoms denote a morbid condition in the action of the heart and arteries. Since the generation of animal heat is so intimately connected with the circulating and the respiratory functions, it is probable that the increase of temperature is the result of some morbid action of the capillary vessels belonging to these systems. What the disordered action of these vessels is which produces increase of temperature we do not know; but the object of scientific observation is in some degree accomplished when it is ascertained that one condition of these functions is invariably connected with a morbidly diminished temperature; another with a morbidly augmented temperature; and another with the temperature of health.

Immediately the circulation is thus excited, the functions of secretion and excretion become deranged. The mouth is now dry and parched; the tongue begins to be covered with fur; thirst comes on; the secretion of the liver, probably also of the pancreas, and certainly of the mucous membrane lining the whole alimentary canal, is vitiated, as is proved by the unnatural quantity, colour, and fetor of the evacuations; the urine likewise is altered in appearance, and the skin is not more remarkable for the sense of heat than for that of dryness and harshness which it communicates to the touch. With the excitement of the pulse and the increase of the heat, the pain in the back and limbs, and the general febrile uneasiness are much augmented.

At this period, then, the fever is fully formed; the series of morbid phenomena is complete: anything more that happens is referrible to degree and to duration, and must be the result of one or other of these circumstances, or of their combined operation.

As soon as the preternatural heat comes on, pain begins to be felt in the head. The pain of the head is often slight at first, and occasionally it remains slight throughout the disease: at other times it is pretty severe. Cases sometimes occur, in which, instead of pain there is only a sense of giddiness, and now and then the uneasy feeling is described as that of lightness; or on the contrary, as that of heaviness or weight. But whether the feeling be pain, and that pain be slight or severe, or whether it be giddiness or lightness, or heaviness, it indicates a similar condition of the organ and requires a similar treatment.

With the accession of pain of the head there is a manifest increase in the disturbance of the sensorial functions. The inability to think, to compare, to reason, to judge, great as it was at the commencement, is now much greater. Instead of being more dull, there are certain states of the mind which now become more acute and vigilant even than in health. Sensation itself, at this period, is invariably acuter than natural, as is indicated in all the organs of sense. The eye cannot well bear the light: there are few cases in which the full glare of day does not excite uneasiness, while in many the ordinary light of a room cannot be borne: in these cases the opening between the eyelids is frequently observed to be contracted, as if from an involuntary effort to exclude a portion of that stimulus which in health excites no inconvenience, and this state of the eyelids assists in giving to the eye its dull and heavy expression so characteristic of fever. The increase of sensibility in the organ of hearing is equally striking. Sounds which were not noticed during health become acutely and even distressingly sensible, while accustomed noises, such as that of a crowded street, are always painful and often intolerable. The skin, considered as an organ of touch, is in a like morbid state. An impression barely sufficient in the state of health to produce sensation excites the feeling of tenderness, and alternations of temperature which in ordinary states are scarcely perceptible are painful. The senses of taste and smell, on the contrary, are nearly obliterated, owing to the altered condition of the membranes upon which the sensitive nerves are distributed.

From the earliest attack of the disease the sleep is disturbed and unrefreshing; now scarcely any is obtained; the febrile uneasiness will not allow of repose, the patient cannot remain in any position long, incessantly shifting his place, never eluding his pain. At this stage the sense of uneasiness in the limbs, oftentimes the severity of the pain over the whole body, is peculiarly distressing.

With this progressive increase in the affection of the spinal cord and the brain, the derangement in the circulating system is proportionally augmented. The pulse is invariably altered, both in frequency and character. Generally it rises to 90, sometimes to 100; but in this form of fever it seldom exceeds this number; and occasionally it never rises above 80. The stroke of the pulse is usually stronger and fuller than natural, though it commonly retains its softness, and does not impress the finger with that sensation of sharpness which is characteristic of ordinary inflammation. Occasionally, however, a degree of sharpness may be perceived in it, and it is not easily compressed.

The thin white fur which already had begun to appear on the tongue progressively increases in extent and thickness. The colour of the fur usually changes as the disease advances, from a dirty white to an ash colour; but in this form of the disease the tongue always remains moist and

never becomes brown. This state of the tongue is almost always accompanied with thirst, but it is never urgent. There is always a loss of appetite. The bowels are generally constipated, and the secretions of the whole alimentary canal are vitiated.

Thus we perceive that the progress of the disease consists in increasing mental and corporeal weakness; increasing pain in the back, loins, and limbs; increasing heat of skin, acceleration of pulse, and general febrile uneasiness, together with the occurrence of pain in the head, and progressive derangement in the functions of secretion and excretion.

The fever in this mild form is now at its height. It remains stationary, or at least with very little change, for an indefinite period, generally for some days. The cerebral affection does not increase beyond what has been described: there are no greater indications of disease in the respiratory organs, and the mucous membrane of the stomach and intestines does not denote any progressive advancement in disease.

In the great majority of patients in whom the symptoms continue thus moderate, the disease disappears about the end of the second week, that is, they are convalescent at that period; but it usually requires eight or ten days longer before they have regained sufficient strength to leave the sick chamber. Sometimes, although there is no greater severity in the symptoms, the disease is more protracted, and the recovery is not complete until the fourth or even the fifth week. Beyond this period it is very rare for this form of the disease to be protracted.

Almost all who are attacked with the malady in this its mildest form recover: but now and then it happens that the symptoms go on with this degree of moderation until about the end of the second week. Then at the period when it is usual for convalescence to take place there is no perceptible improvement; the patients seem even to grow weaker; they lie more prostrate in the bed, and they are soon incapable of moving; still they complain of no pain or uneasiness, and it is not easy to detect any trace of disease in any organ; yet it is but too evident that they grow worse, and ultimately they sink exhausted. In these cases, on examination after death, it is commonly found that disease has been preying on some vital organ, although its presence could not be detected during life; and this termination of the milder type of fever rarely happens excepting in aged persons whose constitutions have been enfeebled by previous diseases, or worn out by the various causes which depress and exhaust the powers of life.

With an occasional exception of this kind, the disease in this form always terminates favourably; and the first indication of returning health is remarkably uniform: it is almost always marked by longer and more tranquil sleep. Instead of that restlessness which is so characteristic of fever, and which forms the most distressing part of it, the patient is observed to lie more still, and on waking for the first time from an undisturbed slumber, he often spontaneously says that he feels better. Better he may feel, for his febrile uneasiness is gone; the load that oppressed him is shaken off; he is a new being. The pain of the head and of the limbs is so much diminished, that often he cannot help expressing his thankfulness at the change. The countenance becomes more animated; its natural expression returns; the tongue begins to clean, and after this state of the system has continued for two or three days the appetite returns. While these favourable changes are going on the pulse usually sinks about ten beats below its highest point at the height of the fever; it is not uncommon however for it to remain quick during the entire period of convalescence; and for some considerable time it is easily excited on any movement of the body, or any emotion of mind. In some cases, on the contrary, when the attack has been very mild, it sinks considerably below the natural standard, and is intermittent, a sign which has been observed to be attended with a sure and steady convalescence. In the mean time the appetite becomes keener than natural; the strength gradually improves; and in a short time the patient is restored to his usual health and vigour.

What the condition of the brain and of the organs correlatively affected is, in these the mildest cases, we do not positively know, because we have no opportunity of inspecting them, their favourable termination being nearly without exception. But the more all the phenomena are considered in their entire series, in the order of their succession, in the uniformity, nay, even in the exclusiveness of their seat, as well as in the unchanging sameness of their effects, the more clear the evidence will appear of the soundness of the induction, that the condition of all the organs in all the types of fever is the same in nature, although there be no two cases of any type perfectly the same either in the degree of the affection or in the stage of the morbid process which it excites. If this induction be really just, we must conceive that, in the Synochus Mitior, while the morbid affection of the organs is slight, the diseased process which it sets up in them stops before it produces any change in their structure.

The transition of a mild case of fever into a severe one, or the progress of a case severe from the commencement, is accompanied with or depends upon certain changes that take place in certain organs. These changes occur with great regularity; the organs in which they take place are always the same; and the symptoms by which they are denoted are uniform. The organs affected are the spinal cord, the brain, the membranes of both, the mucous membrane of the lungs, and the mucous membranes of the intestines. Other organs become affected in the progress of the malady, but these are the organs which in a greater or less degree are invariably diseased, and which therefore must be considered as the true seats of the structural changes that take place in the regular course of fever. Accordingly in all the severer cases, the symptoms, which are only the external indications and expressions of the successive changes that take place in the internal organs, have their seat either in the head, in the thorax, or in the abdomen. Mixed and blended as these symptoms appear in the different cases which the practitioner is actually called upon to treat, they seem so complex and variable as to bid defiance to any arrangement: when analyzed, nothing is more remarkable than their simplicity and their uniformity.

Previous to the changes of structure that take place in the internal organs, it is probable that the different fluids undergo changes no less important. There is indeed a controversy whether the very first change that takes place does not take place in the fluids, and more especially in the blood. There cannot be a question that a morbid change takes place in the blood at a very early period of fever; that that change is different at different stages of the disease; that it is essentially different according to the particular type of fever, and that it is always great in proportion to the severity of the attack. Without entering here into the controversy whether the very first event in the series be a morbid change in the blood, it is manifest that this fluid cannot but become diseased in the progress of fever, because all the processes by which the depuration of the blood is effected are disturbed, and consequently matters which it is the office of these depurating organs to remove from the circulating mass accumulate in it. Moreover, there is evidence that the constitution of the blood itself becomes deranged, and that the natural proportions of its essential constituents are subverted. Of course, in a state of the system in which the most important secreting organs are diseased, and in which the fluid that affords the common materials from which the secretions are elaborated is also diseased, the secretions themselves must necessarily become vitiated.

Fever then is a malady in which disease is simultaneously established in the most important organs both of the organic and of the animal life, in the vital fluid which nourishes and stimulates the whole system, in the excretory processes by which the purity of the blood is preserved, and in the secreting processes by which all the different tissues and structures of the body are formed. That it should be always a dangerous disease is therefore not wonderful, but the real extent in which it is the instrument of death is not generally known. Taking together the whole class of febrile diseases, and including the ravages committed by them at all seasons and in all parts of the globe, it is estimated that of the deaths that take place in the human race one half is always produced by these maladies.

No age seems to be actually exempt from fever, but it has been clearly shown that there are particular periods of life when the human constitution is peculiarly susceptible to the disease. Thus from facts obtained from the records of the London Fever Hospital, it appears that in the year 1825, out of 588 patients, there were attacked under 10 years of age 42, under 15 years of age 67, under 20 years of age 172, under 25 years of age 133, under 30 years of age

81, under 35 years of age 29, under 40 years of age 28, under 50 years of age 10, while from the age of 55 to 85, the number attacked varies from 1 to 2. In the year 1826, out of 676 patients there were attacked under 10 years of age 27, under 15 years of age 87, under 20 years of age 170, under 25 years of age 143, under 30 years of age 102, under 35 years of age 46, under 40 years of age 37, under 45 years of age 28, under 50 years of age 13, while from the ages of 55 to 85 the largest number attacked at any period does not exceed 5. In the year 1827, out of exactly the same number of patients, 676, there were attacked under 10 years of age 25, under 15 years of age 70, under 20 years of age 163, under 25 years of age 164, under 30 years of age 107, under 35 years of age 35, under 40 years of age 50, under 45 years of age 20, under 50 years of age 13, while from the ages of 55 to 85 at one period that of 60, there were attacked 13, but at all other ages the numbers attacked were only from 2 to 4.

The same records incontestably show that fever, that grand agent of death, carries on its ravages in a ratio which steadily and uniformly increases as the age of its victim advances. The experience of the London Fever Hospital for the ten years preceding 1834, an observation including nearly 6000 patients affected with fever, having been submitted to Mr. Finlaison, he found, among other curious and instructive results, that the mortality of fever resolves itself into the following remarkable progression. Thus, suppose 100,000 patients to be attacked with this disease between the ages of 5 and 16, of these there would die 8266; and of an equal number between—

15 and 26 . there would die	11,494
25 and 36 . . .	17,071
35 and 46 . . .	21,960
45 and 56 . . .	30,493
55 and 66 . . .	40,708
65 and upwards . .	44,643

Thus the risk of life from this malady is twice as great at the age of 31 as it is at 11. It is also nearly twice as great at 41 as it is at 21. It is five times as great at 61 as it is at 11, and nearly four times as great above 65 as it is at 21.

It appears further that sex produces an appreciable difference in regard to susceptibility to the disease. Thus, in the year 1825 the total number attacked was—of males 289; females 299. In the year 1826—males 325; females 351. In 1827—males 337; females 339. But while the female is the more susceptible to the disease, she appears to be capable of resisting it better than the male. Thus, in 1825, out of the total number of deaths, 104, there died—males 53; females 51. In 1826, out of the total number of deaths, 110, there died—males 56: females 54. In 1827, out of the total number of deaths, 86, there died—males 48; females 38.

The causes of continued fever are ascertained with tolerable exactness. The exciting cause of continued fever is precisely the same as that of intermittent fever or ague, of which an account has been already given. [AGUE.] What modifications of the poison, or of the constitution, cause the same noxious agent to produce at one time ague, at another typhus, at one time yellow fever, at another plague, and at another sciatica or tooth-ache, are not yet well established; but there is reason to believe that intermittent and remittent fevers are dependent chiefly on a vegetable poison, while, on the other hand, continued fevers have their source chiefly in a poison of animal origin.

Without doubt, a febrile poison purely of animal origin, in a high degree of concentration, would kill instantaneously; and when not intense enough to strike with instantaneous death, it would produce a continued fever with the typhoid characters in the greatest possible degree of completeness and perfection. And this appears to afford the true solution of the origin of the plague. The more closely the localities are examined of every situation in which the plague prevails, the more abundant the sources of putrefying animal matter will appear, and the more manifest it will become, not only that such matter must be present, but that it must abound.

In assigning the reason why Grand Cairo, in Egypt, is the birth-place and the cradle of the plague, Mead states that this city is crowded with vast numbers of inhabitants who live not only poorly but nastily; that the streets are narrow and close; that the city itself is situated in a sandy plain, at the foot of a mountain which keeps off the winds that might refresh the air; that consequently the heat is rendered extremely stifling; that a great canal passes through the midst of the city, which at the overflowing of the tide (the river) is filled with water; that on the decrease of the river this canal is gradually dried up, and the people throw into it all manner of filth, carrion, offal, and so on; that the stench which arises from this, and the mud together, is intolerably offensive; and that from this source the plague constantly springing up every year, preys upon the inhabitants, and is stopped only by the return of the Nile, the overflowing of which washes away this load of filth; that in Ethiopia the swarms of locusts are so prodigious that they sometimes cause a famine by devouring the fruits of the earth, and when they die create a pestilence by the putrefaction of their bodies; that this putrefaction is greatly increased by the dampness of the climate, which, during the sultry heats of July and August, is often excessive; that the effluvia which arise from this immense quantity of putrefying animal substance, combined with so much heat and moisture, continually generate the plague in its intensest form; and that the Egyptians of old were so sensible how much the putrefaction of dead animals contributed towards breeding the plague, that they worshipped the bird Ibis for the services it did in devouring great numbers of serpents, which, they observed, injured by their stench when dead as much as by their bite when alive.

Nothing can be more striking than the cases recorded by Pringle, and which daily occurred to him, of the production of fever exquisitely typhoid (according to the language of that day, jail and hospital fever,) and of the sudden transition of intermittent and remittent into the continued and typhoid type, from the presence of a poison clearly and certainly of animal origin. Whenever wounded soldiers with malignant sores or mortified limbs were crowded together, or whenever only a few of such diseased persons were placed in a room with the sick from other diseases, with those labouring under intermittent and remittent, for example, a severe and mortal typhus immediately arose; nay, whenever men previously in a state of sound health were too much crowded together for any considerable time, typhus (jail or hospital fever) was sure to be produced. The instances of such occurrences that are detailed are too numerous to be cited, but they are so clearly stated and so striking that they ought to be consulted by whoever is desirous of clearly tracing the operation of this great cause of fever.

But by far the most potent febrile poison derived from an animal origin is that which is formed by exhalations given off from the living bodies of those who are affected with fever, especially when such exhalations are pent up in a close and confined apartment. The room of a fever patient, in a small and heated apartment in London, with no perflation of fresh air, is perfectly analogous to a stagnant pool in Ethiopia full of the bodies of dead locusts. The poison generated in both cases is the same, the difference is merely in the degree of its potency. Nature with her burning sun, her stilled and pent-up wind, her stagnant and teeming marsh, manufactures plague on a large and fearful scale. Poverty in her hut, covered with her rags, surrounded with her filth, striving with all her might to keep out the pure air and to increase the heat, imitates nature but too successfully; the process and the product are the same, the only difference is in the magnitude of the result. Penury and ignorance can thus at any time, and in any place, create a mortal plague: and of this no one has ever doubted. Of the power of the living body, even when in sound health, much more when in disease, and above all when that disease is fever, to produce a poison capable of generating fever, no one disputes, and the fact has never been called in question. Thus far the agreement among all medical men of all sects and of all ages is perfect.'

Since the above was written the true nature of these poisonous exhalations has been demonstrated by direct experiment. It has been found that if a quantity of the air in which these exhalations are diffused be collected, the vapour can be condensed by cold and other agents, and a residuum of animal or vegetable matter be obtained which is found to be highly putrescent, constituting a deadly poison. A minute quantity of this concentrated poison applied to an animal previously in sound health destroys life with the most intense symptoms of malignant fever. If, for example, ten or twelve drops of a fluid containing this highly putrid matter be injected into the jugular vein of a dog, the animal is seized with acute fever, the action of the heart is inordi-

nately excited, the respiration is accelerated, the heat increased, the prostration of strength extreme, the muscular power so exhausted that the animal lies on the ground wholly unable to stir or to make the slightest effort, and after a short time it is actually seized with the black vomit, identical in the nature of the matter evacuated with that which is thrown up by an individual labouring under yellow fever. It is possible by varying the intensity and the dose of the poison thus obtained to produce fever of almost any type, endowed with almost any degree of mortal power.

When these facts are connected with the absorbing power of the lungs, explained in the same work from which the above passage is extracted (2nd vol. of the *Philosophy of Health*), we can no longer wonder that when the poison is in a high degree of concentration a single inspiration of it should be capable of producing almost instantaneous death; and that when it is diffused in the atmosphere in a less concentrated state, the continual inspiration of it should generate the mortal disease which experience teaches us that it produces.

It is impossible to estimate too highly the importance of these facts, in a practical point of view, as indicating the direction in which human industry and skill should be put forth to destroy the great sources of fever, that is, to put an end to that terrible malady by whose sole agency one half of the human race perishes, and whose principal ravages are committed at the very age when life is most precious to the possessor, and most useful to the community.

The treatment of fever, a subject of some difficulty, but of the utmost moment, belongs to the several heads of Synochus, Typhus, Petechial Fever, Plague, &c.

(Sydenham's works; Mead's *Short Discourse concerning Pestilential Contagion, and the Methods to be used to Prevent it;* Sir John Pringle's *Observations on the Nature and Cure of Hospital and Jayl Fevers, in a letter to Dr. Mead; and Observations on the Diseases of the Army;* Clutterbuck *on Fever;* Southwood Smith's *Treatise on Fever; Philosophy of Health;* Copland's *Dict. of Practical Medicine; Cyclopædia of Practical Medicine.*)

FEVERSHAM, or FAVERSHAM. [KENT.]

FEVRE, LE. [DACIER.]

FEZ. [MAROCCO.]

FEZZAN, a country in northern Africa, between 24° and 31° N. lat. and 12° and 18° E. long., may be considered as the greatest oasis of the Sahara, by which it is enclosed on the west and east, and partly also on the south. On the north it borders on a less desert region, which belongs to the regency of Tripoli. Where it borders on the desert, its boundary, of course, is not exactly fixed. On all sides it is surrounded by nomadic nations; on the north and east by Arabs, and on the south and west by the Tibboos and Tuaricks.

Its northern part is traversed by two ridges of stony and sandy mountains, or rather hills; for it seems that their elevation above their base does not exceed 1200 feet. They are called in the eastern district El Harush, but in the western they take the name of Ghurian Mountains and Soudah Mountains. The country south of these ridges contains large plains, covered with sand, and without any traces of vegetation; but some ridges of hills from 300 to 600 feet high, rise above the plains, and inclose valleys between them, which are the only parts capable of cultivation. The cultivable portion of the country hardly exceeds one-tenth of its surface, which according to Hornemann extends 300 miles from north to south, and 200 from east to west. The hills have rugged, irregular, and peaked summits, and are composed of thick beds of blue clay, alternating with sandstone, beds of alum-slate, and thick strata of porphyritic clay-stone (Denham); the tops consist of sandstone. The soil in the valleys is a stratum of sand, lying on chalk or clay, which is rendered fit for agricultural purposes by irrigation. As there are no rivers or brooks, and only very few natural springs, the irrigation is effected by wells, water being commonly found at a depth of about 100 feet. The heat in summer is very great, but in winter, during the northern winds, the cold is unpleasant even to Europeans. Rain is very rare; in some districts it does not rain for some years together; and in all of them it rains very little at a time. Violent gales are rather frequent, especially from the north and south, which fill the air with clouds of sand.

Date-trees, which constitute the principal wealth of the country, grow plentifully near the towns and on some plains, where the soil is impregnated with saline matter. Some wheat, barley, and doura are cultivated, but not enough for the consumption. Goats and asses are reared in great numbers; cows, sheep, horses, and camels are not so numerous. All these animals feed on dates or their kernels.

The principal town, Mourzuck, is surrounded by a wall, and contains about 2500 inhabitants. Towards the northern boundary is Sockna, with about 2000 inhabitants. Zuila, east of Mourzuck, is not so large.

The number of inhabitants is estimated by Hornemann at 70,000 or 75,000. In the northern districts they resemble their neighbours, the Arabs, but in the southern they have rather the features of the Tuaricks or Tibboos, who belong to the widely spread nation of the Berbers. They are all Mohammedans, and commonly use the Arabic language. Their sovereign exercises despotic power, but is in some degree dependent on the bey of Tripoli, to whom he annually sends presents of gold-dust and slaves. He receives from his subjects a portion of the produce of the ground, and levies some duties on the merchandize which passes through his territories.

Fezzan is of some importance in a commercial point of view, being the most frequented road by which Soodan communicates with the countries along the Mediterranean. From October to February numerous cafilas arrive at Mourzuck from Cairo, Bengazi in Barca, Tripoli, Gadames, Twat, Bornou, and Soodan; and the neighbouring Tibboos, Tuaricks, and Arabs then visit its market. The traders dispose of part of the produce of their respective countries at Mourzuck, and carry the rest farther on. The industry of the inhabitants is limited to the manufacturing of coarse blankets, which form the principal dress of the lower classes. (Hornemann's *Journey from Egypt to Fezzan;* Denham and Clapperton's *Narrative of Travels and Discoveries, &c.*)

FIBER. [BEAVER, vol. iv. p. 121; MURIDÆ.]

FIBRE and FIBROUS TISSUE. A fibre is a minute thread or filament, apparently the form which solid animal matter, for the most part, assumes in its first stage of organization. It has been stated, that the different kinds of matter which enter into the composition of the animal body, when the analysis is carried to its ultimate point, are resolvable into two primitive forms: first, a substance capable of coagulation, but possessing no determinate figure; and secondly, a substance consisting of rounded particles. The coagulable substance is capable of existing by itself; the rounded particles are never found alone, but are invariably combined with coagulated or coagulable matter. Alone or combined with the rounded particles, the coagulable matter forms, when liquid, the fluids; when coagulated, the solids.

When solid, the coagulable matter is disposed in one of two forms, either in that of minute threads or fibres, or in that of minute plates or laminæ; hence every solid of the body is said to be either fibrous or laminated.

Fibrous or laminated, this concrete substance is variously modified, either alone or in combination with the rounded particles. These different modifications and combinations constitute different kinds of organic substance. When so distinct as obviously to possess a peculiar structure and peculiar properties, each of these modifications is considered as a separate form of organized matter, and is called a *primary* tissue. Of these primary tissues, the peculiar substance termed membrane appears to be the simplest, which is formed by the arrangement of this concrete matter into straight thready lines, at first so small as to be imperceptible to the naked eye. Vast numbers of these threads successively uniting, at length form a single thread of sufficient magnitude to be visible, but still smaller than the finest thread of the silk-worm. If the length of these threads be greater than their breadth, they are called fibres; if, on the contrary, their breadth exceed their length, they are termed plates or laminæ. By the approximation of these fibres or plates in every possible direction, and by their accumulation, combination, and condensation, is constituted the simplest form of organized substance, the primary tissue called membrane.

Membrane, composed for the most part of fibres, so disposed as to form a net-work, may be said to constitute the basis of the animal body. Into the meshes of this membranous net-work are poured the different kinds of animal matter which constitute the different kinds of animal tissue. Thus nerves are composed of nervous matter deposited in

the interstices of a membranous net-work; muscles are composed of muscular substance deposited in the interstices of a membranous net-work; bones are composed of earthy particles deposited in the interstices of a membranous net-work. The threads of which this membranous net-work is composed preserve their fibrous arrangement when built up into complex structures. Hence, perfectly formed membranes, nerves, muscles, and bones, present a fibrous structure, often visible to the naked eye, and always manifest in the analysis of these organs. The larger fibres of which some of these organs, nerve and muscle for example, are obviously formed, consist of smaller fibres, and these of still smaller fibres, until we come at length to a primitive fibre of extreme minuteness. Professor Ehrenberg states that there are nervous fibres which can only be discerned by the aid of a magnifying power of 300 diameters, and others which can only be brought into view by a magnifying power of 800 diameters; and the primitive muscular fibres are commonly supposed to be still more minute.

But though membranes, muscles, nerves, and bones are composed of fibres, and present a manifestly fibrous structure, yet there is one particular tissue which is called fibrous by way of eminence; a bad name for it certainly, but still it has been so long and so extensively in use among anatomists that it is difficult to change it. The tissue specially called fibrous consists of the membrane that covers the bones and cartilages (the periosteum and perichondrium); the membrane that is spread over or that forms a part of certain mucles, constituting the muscular aponeuroses or fasciæ; the membrane that forms the sheaths in which tendons are included; the outer membrane that envelopes the brain and spinal cord (the dura mater and its continuation down the spinal canal); the firm membrane in which the more delicate muscles and the humours of the eye are contained (the tunica sclerotica); the outer membrane forming the bag that contains the heart (the pericardium); the membranes by which the bones in general are tied together and the joints in particular are secured, called ligaments; and the firm cords in which many muscles terminate and which form their movable extremities, termed tendons. Though these substances are extensively diffused through the body, and are apparently independent of each other, yet they are closely connected together, and form a peculiar system. The firm and resisting threads which constitute the basis of these different organs are composed of condensed cellular tissue. The peculiar animal substance of which they consist is coagulated albumen and gelatine, intermixed with a small quantity of mucous and saline matter.

All the proper fibrous organs possess, in the language of anatomists, a low organization; that is, they receive but a comparatively small quantity of blood, and their blood-vessels are so minute in size, that they are generally incapable of admitting the red particles of the blood. They receive few nerves, and these are so small that some anatomists have doubted whether they are supplied with any nerves at all; but their sensibility in certain states of disease proves that they are not absolutely destitute of sentient nerves. In like manner, few absorbents can be traced to them; yet the ravages of disease in the neighbourhood of joints, the sloughing of tendons, and the destruction of the periosteum by the pressure of aneurism, abundantly testify that they are supplied with absorbent vessels. But the office of all the fibrous organs is mechanical; they are adapted either to contain, support, and defend more delicate organs, or they constitute strong and unyielding bands which tie joints firmly together. A high degree of organization, great vascularity, great sensibility, would have disqualified them for their office. What they principally need is a power of cohesion sufficient to enable them to resist rupture, and to sustain the opposing shocks to which the joints are exposed in the violent movements of the body; the less sensibility they have the better, and accordingly they are so organized that while their physical properties render them by far the strongest parts of the animal frame, they are endowed only with just a sufficient degree of vitality to constitute them integrant parts of the living system.

(Grainger's *General Anatomy*; *Cyclopædia of Anatomy and Physiology*, *in loc.*; *Philosophy of Health*, vol. i.)

FIBRE, VEGETABLE, one of the most elementary forms of vegetable tissue. It consists of excessively delicate threads, twisted spirally in the interior of a cell or tube. It is uncertain whether the fibre is solid or hollow, its tenuity being such as to baffle all microscopical observers who have yet examined it. It is this elementary fibre which, being turned spirally round a long delicate tube with its spires in contact, forms the elastic spiral vessel. It occurs in the interior of common cells, when its turns cross each other and produce a netted appearance. It is frequent in the cellular tissue which forms the lining of an anther, and is supposed to have some connection with the opening of that organ. In its naked state, uncombined with membrane, it is supposed to be very rare. On the surface of some seeds, as Collomia linearis, it has been observed in this condition in great abundance, in the form of spiral threads of a highly elastic nature. It is also reported to appear in several minute fungi, but this is a point that requires confirmation.

Vegetable fibre should not be confounded with the woody fibre of plants, which consists of tough straight tubes either single or adhering in bundles. Of this, which forms the thread of hemp, flax, and the like, some account is given hereafter. [WOODY TISSUE.]

FIBRIN (coagulable lymph, gluten), an animal proximate principle consisting of the portion of the coagulum of the blood which remains after the removal of the red particles [BLOOD], and forming the basis of muscle. The fibrin of the blood is best obtained by what is called whipping the blood, that is, by rapidly stirring a quantity of fresh drawn blood with a spoon or a piece of stick. During this process the blood coagulates and the coagulum adheres to the spoon or stick. The red particles which are mixed with this coagulum may be removed by washing it in large and repeated portions of water; the substance that remains is fibrin nearly in a state of purity.

During the state of life the fibrin is contained in solution in the fluid part of the blood, the liquor sanguinis. Professor Müller obtained fibrin in a state of purity from frog's blood by opening one of its large arteries, or by laying bare and incising the heart itself. This blood being received into a watch-glass and the process of coagulation watched, it was observed that previously to the complete coagulation of the blood there formed a small colourless coagulum clear as water. 'Having brought a drop of pure blood,' says Müller, 'under the microscope, and diluted it with serum, so that the blood corpuscles lay completely scattered about and separated from each other, I observed that in the interval between the blood-corpuscles a coagulum of previously dissolved matter was produced, by which the whole separated blood globules were connected together. I was then able to remove at the same time all the blood-corpuscles, notwithstanding their wide distribution and the size of the intervals between them, by raising with a needle the fibrous coagulum occupying the intervening spaces. As the blood-corpuscles of the frog are rendered by a microscope uncommonly large, this observation admits of the greatest distinctness, and allows no ambiguity to remain on the subject. There is still however an easier and more convincing method of proving that fibrin is dissolved in frog's blood. As I showed from experiment that the blood-corpuscles of the frog are about four times larger than the blood-corpuscles of men and mammalia, I concluded that perhaps the filter would keep them back, while it allowed the corpuscles of men and mammalia to pass. This is the case. The experiment may be made on a small scale with the blood of a frog alone; a small glass funnel and a filter of common white filtering-paper or thick printing paper are the only requisites. The paper must previously be moist, and it is well to add an equal quantity of water to the fresh blood of the frog. The liquid which flows through the filter is an almost colourless clear serum diluted with water, with a slight tinge of red, from the colouring matter dissolved by the water. As however the solution of the colouring matter of frog's blood by water requires a considerable time, the filtered fluid can scarcely be termed reddish, and is sometimes quite colourless. If, instead of water, a solution of sugar in water (one part of sugar to 200 or more of water) be employed, no colouring matter will be dissolved during the filtration, and the filtered liquid is quite colourless and without the slightest trace of mixture. If the filtered serum be examined under the microscope, no trace of corpuscles can be detected. In this clear serum in the course of a few minutes a colourless coagulum is formed, so clear and transparent that it is not even detected after its formation until it is raised out of the fluid with a needle. It gradually thickens and becomes whitish and fibrous; it then assumes gradually the appearance of the coagulum of human lymph. In this way the fibrin of the blood is ob-

tained in the purest state, and this has not hitherto been done.'

Pure fibrin is of a whitish colour, inodorous and insoluble in cold water; it is a solid substance, tough, elastic, and composed of thready fibres.

The relative quantity of fibrin contained in the blood varies greatly according to the state of the system at the time it is obtained.

It is stated by Brande, who has given a full account of the chemical properties of fibrin, that fibrin and albumen [ALBUMEN], if not identical, are very closely allied, and appear rather to differ in organization than in essential chemical character. 'The ultimate composition of fibrin has been determined by Gay Lussac and Thenard, and by Michaelis, who made a comparative analysis of that of arterial and venous blood: the following are their results:—

	Gay Lussac and Thenard.	Michaelis. Arterial.	Michaelis. Venous.
Nitrogen	19·934	17·587	17·267
Carbon	53·360	51·374	50·440
Hydrogen	7·021	7·254	8·228
Oxygen	19·685	23·785	24·065
	100·000	100·000	100·000

The mean of these results gives nearly the following atomic composition:—

	Atoms.	Equivalents.	Theory.
Nitrogen	1	14	19·72
Carbon	6	36	50·70
Hydrogen	5	5	7·04
Oxygen	2	16	22·54
	1	71	100·00

That variety of fibrin which constitutes muscular fibre is so interwoven with nerves, vessels, and cellular and adipose tissue, that its properties are probably always more or less modified by foreign matters. 'To obtain the fibrin of a muscle, it must be finely minced and washed in repeated portions of water at 60° or 70°, till all colouring and soluble substances are withdrawn, and till the residue is colourless, insipid, and inodorous; it is then strongly pressed between folds of linen, which renders it semitransparent and pulverulent. Berzelius observes, that in this state it becomes so strongly electro-positive when triturated, that the particles repel each other and adhere to the mortar, and that it still retains fat, which is separable by alcohol or æther. When long boiled in water, it shrinks, hardens, and yields a portion of gelatine, derived from the interstitial cellular membrane; the fibrin itself is also modified by the continued action of boiling water, and loses its solubility in acetic acid, which, when digested with it in its previous state, forms a gelatinous mass, soluble in water, but slightly turbid, from the presence of fat and a portion of insoluble membrane, derived apparently from the vessels which pervaded the original muscle. It is soluble in diluted caustic potass, and precipitated by an excess of muriatic acid, the precipitate being a compound of fibrin with excess of muriatic acid, and which, when washed with distilled water, become gelatinous and soluble, being reduced to the state of a neutral muriate of fibrin.

'When the fibrin of muscle is mixed with its weight of sulphuric acid, it swells and dissolves, and when gently heated, a little fat rises to the surface, and may be separated: if the mass is then diluted with twice its weight of water, and boiled for nine hours (occasionally replacing the loss by evaporation), ammonia is formed, which combines with the acid, and on saturating it with carbonate of lime, filtering, and evaporating to dryness, a yellow residue remains, consisting of three distinct products: two of these are taken up by digestion in boiling alcohol of the specific gravity of .845, and are obtained upon evaporation; this residue, treated with alcohol of the specific gravity of .830, communicates to it (1) a portion of a peculiar extractive matter, and the insoluble remainder (2) is white, soluble in water, and crystallizable, and has been called by Braconnot *leucine.* It fuses at 212°, exhaling the odour of roasted meat, and partly sublimes: it is difficultly soluble in alcohol. It dissolves in nitric acid, and yields on evaporation a white crystalline compound, the *nitro-leucic acid.* The portion of the original residue, which is insoluble in alcohol (3), is yellow, and its aqueous solution is precipitated by infusion of galls, subacetate of lead, nitrate of mercury, and persulphate of iron. It appears therefore that the products of the action of sulphuric acid upon the fibrin of muscle are, 1. an extractive matter soluble in alcohol; 2. leucine; and 3. extractive, insoluble in alcohol, but soluble in water.'

(Brande, *Cyclopæd. of Anatomy and Physiology in loc.*; Professor Müller *on Human Physiology*; *British Annals of Medicine*; *Philosophy of Health*, vol. i.)

FI'BULA. The fibula (*péroné*, Fr., *περόνη, a bodkin*) is a long slender bone swelling out at both ends, by which it is firmly attached to the outer side of the *tibia*, or main bone of the leg. The lower extremity forms the projection of the outer ancle: it is received into a deep longitudinal groove at the side of the tibia, to which it is connected by a ligamentous union; and is firmly knit to the foot by strong bands of ligament, which spread like the sticks of a fan from the tip of the ancle to the bones of the heel and instep. The upper extremity slants a little backwards, and is articulated with the side of the tibia below the knee, by means of a true joint, having cartilaginous surfaces and a synovial membrane as well as external ligaments. The tendon of the *biceps flexor cruris*, or muscle of the outer hamstring, is implanted into this part of the fibula, which is called its *head*, and spreads over the adjoining bony and muscular surfaces, connecting and supporting them in the double capacity of a ligament and an aponeurosis. There is no greater degree of motion between the tibia and fibula than is sufficient to give some elasticity to the play of the ancle joint, which is secured on the outer side chiefly by the projection of the fibula beyond it. The shaft of the fibula—nearly straight, triangular, hard, a little twisted, and of great strength for its size—is about as thick as the middle finger, and extends like a bowstring across the arch formed by the gradual enlargement of the tibia towards the knee. A strong sheet of fibrous membrane, called the interosseous ligament, tightly stretched from one bone to the other, fills up the greater part of the interval between them, and gives surface for the attachment of muscles and strength to the limb, without adding inconveniently to its bulk or weight. Nine muscles are attached to the fibula. The *biceps cruris*, already mentioned, bends the leg back towards the thigh; three on the fore part raise and extend the toes; the remaining five unite in raising the heel, and press the toes and the ball of the foot against the ground; at the same time turning the sole outwards by lifting its external border. The muscles chiefly concerned in the last-mentioned action are the *peroneus longus* and *brevis*; their tendons pass behind the ancle, lying in a groove of the fibula, which acts as a fixed pully to change the line of their traction, and are inserted into two bones on the outer and inner edge of the sole near the base of the toes. They are very powerful muscles; and when they act with sudden and spasmodic force, in consequence of the foot coming unexpectedly to the ground, are capable of breaking the fibula above the ancle by pressing the foot against its projecting end. This accident happens not unfrequently from the foot slipping unawares over the edge of the curb-stone, and is complicated with various degrees of lateral dislocation, and with severe sprain of the ligaments of the *inner* ancle. The force may be sufficient to break off the tip of the inner ancle; and if the sharp edge of the broken tibia be driven through the skin, which sometimes happens, the cavity of the joint is exposed, and the injury becomes a compound dislocation of the ancle-joint. These accidents are sometimes secondary, the foot being in the first instance forced by the weight against the *inner* ancle, with sprain of the *external* ligaments, and then drawn up with a jerk by the peronei. However produced, the injury is a very serious one, and often requires much good management to prevent permanent lameness or even worse consequences. Minor degrees of it have a general resemblance to simple sprains of the ligaments, and the fracture of the fibula may be overlooked. It may, however, be easily detected, notwithstanding the swelling, by the unusual position of the foot, and by pressing the bones together higher up the leg; for if the fibula be fractured, this cannot be done without a sense of yielding of the otherwise solidly compacted parts, and increase of pain to the patient from the pressure of the broken end of the bone against the soft parts. From the name of the eminent surgeon who first delineated and described this injury, it is called *Pott's fracture.* [FOOT; FRACTURE; TIBIA.]

FI'BULA, a term used among the Romans for the

broach or buckle with which their vests were usually fastened. It is derived from *figo,* 'to fix,' and the most antient form of the word is supposed to have been *figebula.* These fastenings were made in very great variety, both as to material and form, and were sometimes ornamented with engraved stones or gems. Fibulæ of gold were often used as presents. The most common were made of brass or iron. Count Caylus, in his 'Recueil,' pl. 110, fig. 4, has engraved a fibula which served the double purpose of a fastening to the garment and a key. *Fibula* was a term likewise applied by the antients to the iron brace or band used for joining or fastening beams, mentioned by Cæsar (*De Bello Gall.,* l. iv., c. 17) and described by Vitruvius (l. i., c. 5). The *fibula chirurgica* was an instrument used by surgeons for drawing the lips of a wound together, noticed by Pitiscus, in his *Lexicon,* p. 778, who also mentions the *fibula gymnastica,* sive *theatralis,* 'quæ cantoribus et comœdis inserviebat,' particularly described by Celsus, and several times alluded to by Juvenal and Martial. This was a ring of light workmanship.

FIBULA'RIA. [ECHINIDÆ, vol. ix. pp. 260, 261.]

FICE'DULA. [BECCAFICO, vol. iv. p. 125; SYLVIADÆ.]

FICHTE, JOHANN GOTTLIEB, was born in Upper Lusatia in 1762. After receiving a school education, he studied at the universities of Jena, Leipzig, and Wittemberg. He afterwards became acquainted with Kant and Pestalozzi; and in 1792 attracted general attention by his *Versuch einer Critik aller Offenbarung* (Attempt at a Critique of all Revelation), on account of which he was made professor of philosophy at Jena. Here he began to promulgate the system of philosophy which is known under the name of *Wissenschaftslehre* (Doctrine of Science). A treatise on Faith and Providence which he wrote at Jena having brought upon him the suspicion of irreligion, he retired to Prussia, and after living for some time at Berlin, removed to Erlangen, where he was appointed professor of philosophy, with leave to visit Prussia in the winter time.

The character of Fichte has always been held in high esteem. His 'Discourses to the German People' during the French invasion are justly valued, and he is said to have died, as he always lived, for a good cause. During his residence at Berlin in the year 1814, he urged his wife to visit the sick in the military hospital of that city; in consequence of which she caught a fever, from which she recovered, but communicated it to her husband. Fichte died at Berlin in 1814, leaving a son, Immanuel Hermann, now a professor at Bonn, and one of the most distinguished philosophers in Germany.

Fichte's *Wissenschaftslehre* grew out of the philosophy of Kant, of whom he at first considered himself a mere disciple. Kant had dogmatically assumed the school logic as the foundation of his system; the forms of propositions, as affirmative, negative, &c., had supplied him with his table of categories, and he never thought that any one would ask for the origin of these forms themselves. According to the system of Kant, time and space have no existence exterior to the mind, but are merely the forms in which it discerns objects, and which only abide in itself. An intuition (or immediate contemplation) was divided into matter and form: thus in a red surface, the mere colour red was called the matter of the intuition, and the extension its form. The first was held to be a manifestation of something external to ourselves; the latter as merely dwelling in our own minds. This was Kant's theory of sensation (*Transcendentale Æsthetik*) and it is followed by an investigation of the laws of the understanding. These laws he worked out from the table of categories, which, as before said, was constructed from the logical form of propositions. Thus, propositions are divided into universal, particular, and singular. Hence the objects of propositions considered in this light, are 'all,' 'many,' or 'one,' or may be said to come under the categories of 'totality,' 'multiplicity,' and 'unity.' In the same manner, from the divisions of propositions into affirmation, negative, and infinite, Kant got the categories of 'reality,' 'negation,' and 'limitation,' and from the division into categorical, hypothetical, and disjunctive, the categories of 'substance and accident'—'cause and effect'—'action and re-action.' A fourth series of categories obtained from the modal division are 'necessity,' 'actuality,' 'possibility;' and as we cannot think of objects at all except under the forms expressed by those propositions, it follows that all objects of thought must come under the categories. From this Kant concludes, that as time and space are the forms of our intuition, so are 'cause and effect,' &c. the forms of our thought, having likewise no existence without our own minds; and that when we say the law of cause and effect is a law of nature, no more is conveyed than that the law of cause and effect is that under which we are compelled to observe nature, having nothing to do with external things themselves. Kant compares his own system to that of Copernicus, observing that the latter makes the planets move round the sun, and that he in the same manner puts the mind in the centre, and makes the objects adapt themselves to the forms of the mind, instead of the mind following the laws of the objects. Hence, according to his view, we are altogether without knowledge of things in themselves, the extended form in which they appear being merely in our own mind, and likewise the laws by which we suppose they are regulated. We merely contemplate various phænomena, which are the exponents of things we cannot know anything about, and to which these very phænomena do not bear the slightest resemblance.*

Various contemporaries had found it strange that two regions so heterogeneous as those of mind and things in themselves (*dinge an sich*) should at the same time be so admirably adapted to each other, that the latter should accommodate themselves to all the forms of the former; and at the same time, the taking of a common book of logic, assuming all its *dicta* as self-evident axioms, seemed rather a superficial proceeding. The sceptical adversaries challenged the Kantists to prove that there was a necessary connection between the *form* and the *matter* of knowledge.

Aroused by these attacks, Fichte, as a disciple of Kant, began to inquire what was the absolute form of knowledge, and at the same time what lay at the foundation of logic, the mere assumption of which, as a self-evident science, did not satisfy him. He saw that all logic depended on the propositions of identity and contradiction. 'A is A,' and 'Non-A is not A.' He then asked himself what is meant by 'A is A;' does it imply that A exists? No, because the proposition 'A centaur is a centaur' is a true one, though the centaur does not exist at all. 'A is A' means no more than 'If A is *given,* it is A;' and A is not A, provided it is not *given.*† 'Given' implies *given to some conscious being;* and hence we find that the truth even of an identical proposition depends on the being of an I or Ego (*das Ich*). The proposition 'A is A' is converted into 'Ego is Ego;' and this is found to depend on no condition, as Ego gives itself, and its very essence consists in its giving itself. From this proposition is obtained the category of reality: reality is that which is given to the Ego. In like manner, 'Non-A is not A' is converted into 'Non-Ego is not Ego;' and from this proposition is obtained the category of negation. Then a question arises, 'How can Ego posit Non-Ego?' It is assumed as an axiom that every thing in Ego is posited by itself; how then can it posit a Non-Ego, which seems an act of self-destruction? It then turns out that Ego posits itself, as determined by Non-Ego. An undetermined being is nothing; determination implies limitation, and hence Ego, by positing itself as a determined being, at the same time posits Non-Ego. The Ego is conceived at first as an unimpeded activity; it meets with a shock (*anstoss*), which causes it to perform an act of reflection, and from this moment it begins to construct a world without itself. It feels itself confined by certain sensations, and hence imagines there must be a being external to itself supporting these sensations. At the same time the very consciousness of confinement implies a consciousness of the capability of freedom; for no being can be aware of a curb that is not striving against it. Freedom manifests itself in the power of directing the attention to some objects to the exclusion of others, or in the imagination of such as are absent. Thus a child who sees its first object cannot divert its attention from that object and think of another; it is completely curbed by the present; while a person who has seen a variety can at pleasure call forth a distant object, and close his mind's eye upon those immediately before him. This is a state of comparative freedom. It is impossible, in this limited space, to follow the *Wissenschaftslehre* through all its ramifications; but what is given above will serve to convey an idea of the principle. Fichte's adversaries accused him of Nihilism and Atheism, and seem to have imagined

* It is not to be understood that the above is intended as a complete view of Kant's system. Only so much is given as to render the account of Fichte intelligible.

† *Gesetzt,* 'posited,' is the proper translation, but 'given' is more familiar.

that he (Fichte) thought he had constructed the whole universe. These objections are answered by his son, in an excellent little book entitled *Beyträge zur Characteristik der neuern Philosophie*, in which he shows that the very being of the Ego proves its own finity, and that consequently his father's doctrine necessarily leads to the assumption of the *absolute*, or God, a being that is infinite. In a tract called *Die Wissenschaftslehre in ihrem allgemeinen Umrisse dargestellt* (Berlin, 1810), the elder Fichte says plainly that God is the only true being, and thus banishes all suspicion of Atheism. His moral doctrines involve a contempt for nature, which he regards as a mere curb over which freedom should triumph; and hence he is averse to all speculative physics, considering nature as the absolutely *given* of which there can be no knowledge, and making all reality proceed from the *knower*, he denies reality to the former. These opinions have led the philosophers of nature (*Natur-Philosophen*) to accuse him of one-sidedness. His son attributes this tendency to the influence of the doctrines of Kant, which always treated nature as a mere appearance (*Erscheinung*), and from which Fichte never became absolutely free.

It is hardly to be expected that the *Wissenschaftslehre* will be rendered perfectly intelligible by the above short notice, when the reader might turn over the whole works of Fichte, and still find the subject intensely difficult and obscure. The design of this article has been to give a hint of the principle, and no more.

An opportunity is here taken of warning the English reader against mere *dabbling* in German philosophy. If he have taste and leisure for the study, is willing to devote to it a considerable portion of his time, and will not refuse to bestow on it the most painful attention, he will find it worth his labour to study the works of Fichte, Schelling, and Hegel. But if he cannot bestow this labour, let him refrain from the subject altogether. The doctrines of the German philosophers are only to be gathered from their own voluminous works, most of which are written in a hard crabbed style; and all the English books which would give a slight view of this philosophy, and a pretty essay on it, are worse than useless, as they generally mislead.

FICHTELGEBIRGE is a mountain-knot or mountain-mass in Germany, situated between 50° and 50° 15′ N. lat., and 11° 45′ and 12° E. long. Its greatest length from north-east to south-west, between the towns of Asch and Baireuth, does not exceed thirty-five miles; and its average width is about twenty-eight miles. It is calculated that this mass of rocks covers about 900 square miles.

The whole mountain-mass is furrowed on all sides by narrow valleys and glens; its most elevated parts extend in plains, on which a few summits rise in the form of domes. These summits form a series arranged along the axis of the mass from south-west to north-east. Those which attain the greatest elevation are the Kösseine, which rises to 3024 feet; the Ochsenkopf, to 3328; and the Schneeberg, to 3424 feet above the level of the sea. The base on which the whole mass rests is about 1700 feet above the sea-level towards the south and west, and towards the east and north about 1800 feet.

The Fichtelgebirge is the centre, in which three extensive mountain-ranges unite, and from which they may be considered to issue. The Erzgebirge begins at its northern extremity near Asch, and runs off in an east-north-east direction, dividing Saxony from Bohemia. From its north-western extremity branches off another range, which is first called the Frankenwald (Forest of Franconia), and farther on takes the name of the Thüringerwald (or Forest of Thuringia); the Harz itself may be considered as the most northern branch of this range. The third range, which is immediately connected with the Fichtelgebirge, is the Böhmerwald (or Forest of Bohemia), which runs off in a south-eastern direction.

In consequence of this disposition of the mountain-ranges which issue from the Fichtelgebirge, the waters collected on its slopes run off to the four cardinal points. On its southern declivity rises the Naab, which joins the Danube, by which its waters are carried to the Black Sea; the Main, rising on the western declivity, mingles its waters with the Rhine; and the Eger, which carries off the waters from the eastern slopes, falls into the Elbe, as well as the Saale, which rises near the northern extremity and runs northward.

The nucleus of the mass is composed of granite, gneiss, and mica-slate; but on the north-western side it is surrounded by extensive beds of clay-slate and grauwake. Its mineral wealth is not great. It contains extensive beds of iron ore, which is the only metal that is worked on an extensive scale. Copper ore occurs frequently, but always in such small quantities that it cannot be worked. Gold was formerly obtained by washing the sand of some rivulets. Alum, serpentine, and coal occur in some places in rather large quantities. In other places there are some precious stones, as garnets, tourmalins, &c.

FICI'NO, MARSI'LIO, born at Florence, A.D. 1433, was the son of Ficino, the physician of Cosmo de' Medici, who perceiving the happy dispositions of the youth, generously provided for his education. Ficino studied Greek, and applied himself especially to the works of Plato, which he translated into Latin. He afterwards translated Plotinus, Jamblichus, Proclus, and Porphyrius, and became a great admirer of the late Platonicians of the Alexandrian school. He was one of the preceptors of young Lorenzo, Cosmo's grandson. Cosmo appointed him president of the literary society which he assembled at his house, and which was called Academia Platonica, having for its object to explain the doctrines of the Platonists. Its meetings, which were greatly encouraged by Lorenzo, were cheered by symposia, or annual banquets, on the anniversary of Plato's birth-day, of one of which, held at the villa of Careggi, Ficino himself gives an interesting description. The Academicians were divided into three classes: 1st, the Mecenati, being the family of the Medici; 2nd, the teachers, who consisted of the most learned men of the time, such as Pico della Mirandola, Poliziano, Leon Battista Alberti, Landino, and others; 3rd, of pupils. (Bandini, *Specimen Literaturæ Florentinæ*, vol. ii.; Brucker, *Histor. Philos.*, tom. iv., period the 3rd, b. 1.)

At the age of forty Ficino resolved to devote himself to the church, and being ordained, his patron Lorenzo conferred upon him a canonry in the cathedral of Florence. He now made an attempt to amalgamate the theology of Plato with Christianity, and in so doing, was at times carried by his zeal beyond the limits of sound criticism or taste. He was however sincere and single-minded, exemplary in his private conduct, mild and moderate in his temper, and, contrary to the practice of most of his contemporaries, was averse from literary feuds and rancorous polemics. Being of a diminutive size, and of very precarious health, he says himself that he hardly passed a day without bodily pain, and yet he constantly applied to study. Much of his time was spent at the various country residences of the Medici near Florence, in which he composed his works. He died in 1499, at the age of sixty-six, and his countrymen raised to him a monument in the cathedral of Florence, with his bust, and an epitaph written by his friend Poliziano. His works were collected and published at Basel, 2 vols. folio, 1491. They consist of translations from the Greek philosophers, original treatises on metaphysics and ethics, his Theologia Platonica, and other writings. His Latin epistles, which were published separately at Venice, 1495, are interesting on account of the details which they contain concerning the distinguished scholars collected at Florence by the fostering patronage of Lorenzo. Ficino wrote also a work 'De Religione Christianâ,' and a commentary on the Epistles of St. Paul. (Roscoe's *Lorenzo the Magnificent*; Corniani, *Secoli della Letteratura Italiana*.)

FICOIDEÆ. [MESEMBRYACEÆ.]

FICTION. [NOVEL; ROMANCE.]

FICTIONS (in Law) have been somewhat quaintly defined to be 'those things that have no real essence in their own body, but are so acknowledged and accepted in law for some especial purpose.' These especial purposes are various. The law, it is said (by which we must understand those who for the time are the interpreters of it), shall never make any fiction but for necessity, and in avoidance of a mischief (Coke's *Rep.* iii. 30). This is as much as to say that those who interpret the law will, in order to avoid a, a horse, and ship, or remove some unexpected difficulty designated the by the law, resort to a fiction, that is, thber of horses in something to be which is not. It is said such a person is have always a good end in view, that is, anurder is particu- good by those who make or maintain the wisely said, that fictions of law must not be ally the chief possible: but the reason is rather curious: the names of imitates nature.' If we object to the sound borne, on whom son in the instance last mentioned, we canqueror. of the following rule as to fictions—that a hereditary in the

be subject to the penalty of a statute by a fiction of law. The law, it was said, would also make fictions in order to avoid absurdity; but this could hardly have been said in earnest.

Blackstone shows (iii. 43) by what manner of fiction the Court of King's Bench originally held pleas of all personal actions—'It being surmised that the defendant is arrested for a supposed trespass, which he never has in reality committed; and being thus in the custody of the marshal of the court, the plaintiff is at liberty to proceed against him for any other personal injury: which surmise of being in the marshal's custody, the defendant is not at liberty to dispute.' Such liberty of disputing the fiction would clearly spoil the whole business, and was therefore as necessarily disallowed as the fiction was allowed. Of the same kind is the fiction mentioned by Blackstone (iii. 107), by which a contract made at sea is feigned to be made at the Royal Exchange, or other inland place, in order to draw the cognizance of the suit from the courts of Admiralty to those of Westminster Hall. 'Such fictions,' as Blackstone remarks, 'are adopted and encouraged in the Roman law: a son killed in battle is supposed to live for ever for the benefit of his parents; and by the fiction of *postliminium* and the *lex Cornelia*, captives, when freed from bondage, were held to have never been prisoners; and such as died in captivity were supposed to have died in their own country.'

Fictions in law, though often ridiculous enough, have generally had their origin in some defect in the existing laws or course of procedure, and have pointed out in what respects the judges or interpreters of law, and, as we may suppose, general opinion also, under the influence of which judges must to some extent be, have felt that change was necessary. Many fictions, so far from being injurious, have been beneficial; but it must be remarked that they are the indications of a rude state of social organization, and must gradually disappear with the improvement of the institutions of society; for their existence supposes a defect which it is the business of legislation to remedy.

FICUS, a large genus of Urticaceous plants having the flowers, both males and females, mixed indiscriminately on the inside of a fleshy receptacle, which is so concave that its edges are drawn together into a narrow opening. This is illustrated by the common eatable fig, the receptacle of Ficus Carica, which, although resembling a fruit as simple as a gooseberry, is in fact a collection of a large number of minute unisexual flowers growing to a succulent base; at its apex will be found the narrow opening where the edges of the receptacle are drawn together, and when its interior is laid bare, the flowers are seen closely packed all over its surface, divided from each other by soft colourless bristle-like bracts or scales. What are called the seeds in the ripe fig are the pericarps, each of which contains a single seed. The calyx is variable in the number of its segments, sometimes having only 3, sometimes 7 or 8. The stamens are solitary in many species, 3 in others, and 5 in some. The pistil consists of a single ovary terminated by an awl-shaped style, ending in a two-lobed stigma.

The number of species of Ficus is very considerable, perhaps as great as that of any arborescent genus. They are all either tropical or inhabitants of warm countries. Some are small plants creeping upon the surface of rocks and walls, or clinging to the trunks of trees like ivy; others are among the largest trees of the forest. All travellers in the woods of South America speak of the noble aspect of the fig trees (meaning species of Ficus not of the cultivated sort), of their gigantic dimensions, and of the thick delightful shade cast by their leafy heads. They are especially remarkable for throwing out roots from their branches, which, after they have reached the ground and established themselves there, increase rapidly in diameter, produce other branches, and thus contribute to extend an individual over a considerable space of ground. Frazer speaks thus of what he saw of their habits in the forests at Moreton Bay in New
In the ... observed several species of Ficus upwards
affirmation ... h, enclosing immense iron-bark trees, on
of 'reality, ... the seeds of these fig trees had been
sion into ca... s. Here they had immediately vegetated,
geries of ... their parasitical and rapacious roots, which
'action and ... o the bark of the iron tree had followed the
tained from ... m downwards to the earth, where, once
'possibility ... gress of growth is truly astonishing. The
under the fe... s then increase rapidly in number, envelop
that all obje... d send out at the same time such gigantic
From this Ka

branches, that it is not unusual to see the original tree, at a height of 70 or 80 feet, peeping through the fig, as if itself were the parasite on the real intruder. In the singular angles or walls, as they are here termed, which are formed by the roots of these trees, and of which I observed many 16 feet high, their is room enough to dine half a dozen persons. The fruit is eagerly sought by Regent birds (*Sericulus chrysocephalus*), blue pigeons, and swamp pheasants (*Cuculus Phasianus*), and the spreading and massy boughs support a number of superb parasitical plants.' Reinwardt assures us ('Ueber den Charakter der Vegetation auf den Inseln des Indischen Archipels') that he observed on the island of Semao a large wood whose trunks all proceeded from one single stem of a Ficus Benjamina, all united with each other by their branches though the trunks were distinct. The well-known Ficus Indica, or Banyan Tree, is another instance of this peculiar habit.

The species abound in a milky juice containing caoutchouc, and there is every reason to believe that what of this substance comes from Java is exclusively procured by tapping different species of Ficus. The best known on the continent of India is yielded by Ficus elastica.

Although the fruit of Ficus carica and some others is eatable, yet the whole genus abounds in an acrid, highly dangerous principle, diffused among the milky secretion. This is perceptible even in the common fig, whose milk produces a burning sensation on the tongue and throat; but when the fruit of that species is ripe, the acridity is destroyed by the chemical elements entering into new combinations. In some species it is so concentrated that they are among the most virulent of poisons. *Ficus toxicaria*, a Sumatra species, and *F. dæmona*, from Tanjore, derive their names from this circumstance, in which many more equally participate.

For an account of the *Ficus carica* see FIG; of a few others, remarkable for their interest, we shall give a brief account.

1. *Ficus Indica*, the Banyan Tree, is a native of most parts of India, both on the islands and the main land. Roxburgh states that it is found in its greatest perfection and beauty about the villages on the skirts of the Circar mountains. The leaves are ovate, heart-shaped, three-ribbed, and entire; when young, downy on both sides; when old, much smoother; they are from five to six inches long, and from three to four broad; at the top of the leafstalk on the underside is a broad, smooth, greasy-looking gland. The figs when ripe grow in pairs from the axils of the leaves, are downy, and about the size and colour of a middle-sized red cherry. The wood is light, white, porous, and of no value. Brahmins use the leaves as plates to eat off; birdlime is manufactured from the tenacious milky juice. If the seeds drop in the axils of the leaves of the Palmyra Tree (*Borassus flabelliformis*), the roots grow downwards, embracing the trunk in their descent; by degrees they envelop every part except the top, whence in very old specimens the leaves and head of the Palmyra are seen emerging from the trunk of the Banyan Tree as if they grew from it. The Hindoos regard such cases with reverence, and call them a holy marriage instituted by Providence. The Banyan Tree, covering with its trunks a sufficient space to shelter a regiment of cavalry, and used as a natural canopy for great public meetings, has been so often described by writers on India as to have become familiar to the reader. The branches spread to a great extent, dropping their roots here and there, which as soon as they reach the ground rapidly increase in size till they become as large as and similar to the parent trunk, by which means the quantity of ground they cover is almost incredible. Roxburgh says that he has seen such trees full five hundred yards round the circumference of the branches, and a hundred feet high, the principal trunk being more than twenty-five feet to the branches, and eight or nine feet in diameter. An excellent account of such a tree will be found in the Oriental Annual for 1834; and a graphic description of the mode of growth in Rumf's 'Herbarium Amboinense,' vol. iii., p. 126. See also 'Asiatic Researches,' iv. 310. It is called Vata in Sanscrit, Bur or But in Bengali, Bagha in Cingalese.

2. *Ficus elastica*, the Indian Caoutchouc tree, is now a common tree in the hothouses of this country. It has large, shining, oval, pointed, thick leaves, small axillary uneatable fruits the size of an olive, and long pink or red terminal buds composed of the stipules rolled together. This species inhabits the Pundua and the Juntipoor mountains,

which bound the province of Silhet on the north, where it grows to the size of a European sycamore, and is called Kasmeer. It is chiefly found in the chasms of rocks and over the declivities of mountains among decomposed rocks and vegetable matter. It produces when wounded a great abundance of milk, which yields about one-third of its weight of caoutchouc. It grows with great rapidity; a tree is described as being twenty-five feet high, with the trunk a foot in diameter when only four years old. The juice of this valuable plant is used by the natives of Silhet to smear over the inside of baskets constructed of split rattan, which are thus rendered water-tight. Old trees yield a richer juice than young ones. The milk is extracted by incisions made across the bark down to the wood, at a distance of about a foot from each other all round the trunk or branch up to the top of the tree, and the higher the more abundant is the fluid said to be. After one operation the tree requires a fortnight's rest, when it may be again repeated. When the juice is exposed to the air it separates spontaneously into a firm elastic substance, and a fetid whey-coloured liquid. Fifty ounces of pure milky juice taken from the trees in August yielded exactly 15½ ounces of clean washed caoutchouc. This subtance is of the finest quality, and may be obtained in large quantities. It is perfectly soluble in the essential oil of Cajeput. (Roxb., *Fl. Ind.* iii. 545.)

3. *Ficus religiosa*, the Pippul Tree, is a large tree common in every part of India, especially near houses, where it is planted for the sake of its extensive dark grateful shade. It is held in superstitious veneration by the Hindoos, because their deity Vishnoo is fabled to have been born under its branches. The leaves are heart-shaped, long, pointed, wavy at the edge, not unlike those of some poplars; and as the footstalks are long and slender, the leaves actually tremble in the air like those of the aspen tree (*Populus tremula*). Silk-worms prefer the leaves next to those of the mulberry. The leaves are used for tanning leather by the Arabs, who call the tree Mudah or Vudáh, and also Uadi Zebid. See *Asiatic Researches*, iv. 309, for further information concerning this.

4. *Ficus Sycomorus*, the sycomore fig, is a large tree found in Egypt, where it is planted extensively by the road-side, near villages, and on the sea-coast, for the sake of the shelter of its very widely-spreading branches. The Arabs call it Djummeiz. Forskähl states that its head is often forty yards in diameter. The leaves are broadly ovate, repand, or somewhat angular, rather blunt, nearly smooth, heart-shaped at the base. The figs are not produced upon the young branches, but in clustered racemes upon the trunk and the old limbs. They are sweet and delicate, and eaten by the Egyptians. The timber appears to be of little value, for Forskähl excludes it from the lists of carpenters' wood, and places it among the trees which are used for firewood. It can hardly therefore have furnished the wood of which mummy-cases were made, as has been supposed. Professor Don, with greater reason, conjectures that they were made from the timber of Cordia Myxa. When old this tree becomes very gnarled and broken, as is shown in a plate in Salt's 'Abyssinia,' where it is figured under the name of Daroo tree, but it is so bare of foliage as to be hardly a picturesque object.

FIDDLE. [VIOLIN.]

FIDEI COMMISS. According to German civil law, the fidei commiss is intimately connected with the law of inheritance among the nobility, being the regulation according to which the whole or part of a family property is enjoyed by a certain member of the family, on the condition of leaving it unimpaired to the person pointed out by the particular family arrangement; either to the first-born male, when it is called *majorat*, or to the last-born male, when it is called *minorat*, or to the oldest member of the family without regard to direct descent, when it is called *seniorat*. Like the English law of entail, the object of this institution is to render the family property inalienable; it may however be mortgaged, but this is merely a temporary sequestration of the revenues which are applied to cancelling the debt. In modern times, this institution, like many others, has been abolished in some parts of Germany, partly by the introduction of the French law, as in the Rhenish provinces, and partly by the amalgamation of the former German civil law with the Code Napoleon, as in Bavaria. In the north of Germany, however, where the antient Saxon law was prevalent, as in Hanover, Saxony, and other countries, it has been maintained, and is still in force.

FIDEICOMMISSUM, in the Roman law, is something given by will or codicil, not directly to the person beneficially interested in it, but to some other person, with a request that he will transfer it to the party for whom it was intended. The person thus intrusted was called Heres Fiduciarius; and the person for whom it was intended Heres Fideicommissarius. It was necessary that an heir (*heres* in the Roman sense) should be named, or no property could be transmitted to the Fideicommissarius. (Gaius, ii., 248, &c.) Originally it entirely depended on the good faith of the trustee (fiduciarius) whether he performed the will of the testator or not.

The origin of these fideicommissa probably was in a desire to evade the strictness of the old civil law; as we see in the case of Q. P. Rufus (Val. Max. iv. 2, 9), who being an exile was incapacitated from taking a gift under the will of a Roman citizen, but yet could claim it from his mother, to whom it had been given in trust for him. In the time of Augustus the rights of the fideicommissarius became legally established by the emperor giving the consuls jurisdiction in such matters. Afterwards pretors were expressly appointed, under the name of prætores fideicommissarii, to take cognizance of such trusts, but the consuls still retained their jurisdiction also. In the provinces the governors (præsides) took cognizance of fideicommissa. (Ulpian, *Frag.* 25, 12.) Fideicommissa, or trusts of specific things, became gradually assimilated as to their qualities and incidents to legacies: the following remarks apply to fideicommissa, where the whole inheritance (hereditas in the Roman sense), or a determinate part, was given to a trustee in trust.

By the old Roman law the *heres*, on taking possession of the testator's property, became liable to all his debts and obligations, and consequently those who only took the property as trustees (*heredes fiduciarii*) often refused to encumber themselves with a burden from which they could derive no advantage, and might sustain great loss. To remedy this inconvenience, it was enacted by the Senatusconsultum Trebellianum, passed in the time of Nero, that when the trustee had given up the property to the fideicommissarius (*cestui que trust* of the English law), all right of actions by or against the trustee, in respect of the property, should be transferred to the cestui que trust.

If the trustee refused to accept the inheritance, the pretor, on the petition of the cestui que trust, could compel him under the Senatusconsultum Pegasianum, passed in the time of Vespasian, to accept and to transfer the property to his cestui que trust, who took it with all its burdens. No particular form was requisite in order to effect this transfer.

By the Senatusconsultum Trebellianum, if the heres was required to transfer not more than three-fourths of the inheritance to the cestui que trust, the two parties were liable to all suits and burdens in respect of the property according to their several shares. If he was required to transfer more than three-fourths or the whole, the S. Pegasianum allowed him to retain one-fourth, as the Falcidian law did in the case of legacies. If the heres let himself be compelled to accept the trust under the S. Pegasianum, he lost his one-fourth. (Dig. xxxvi. Tit. 1; Ad. S. C. Trebellianum.)

The cestui que trust was himself sometimes only a trustee for others, and in this case never had the benefit of the one-fourth: the same was the case if a legatee had to transfer a legacy to another.

FIEF. [FEUDAL SYSTEM.]

FIELD OF VIEW. [TELESCOPE.]

FIELDFARE. [MERULIDÆ.]

FIELD MARSHAL, a military dignity conferred on such commanders of armies as are distinguished by their high personal rank or superior talents.

It has been supposed that the term marshal is derived from *Martis Seneschallus*, but it is more probable that it came from the Saxon words *mar*, or *marach*, a horse, and *scalck*, a servant; and it appears to have designated the person who had the care of a certain number of horses in the royal stables. In the Teutonic laws such a person is called *maris calcus*, and the fine for his murder is particularly specified.

The earl-marshal of England had originally the chief command of the army; and history records the names of two noblemen, De Montmorency and Fitzosborne, on whom the title was conferred by William the Conqueror.

The office was by Henry VIII. made hereditary in the

family of the duke of Norfolk; but it is probable that it had before that time ceased to be connected with the military service; for from the 'Anecdotes of the Howard Family,' we learn that while another person held the post of earl-marshal, Sir Robert Willoughby Lord Brooke was appointed by Henry VII. to be marshal of the army.

The title of Maréchal de France appears to have become a military dignity in that country in the time of Philip Augustus; and, according to Père Daniel, the first person who held it was Henry Clement, the commander of the French army at the conquest of Anjou in [illegible]. Originally there was but one Maréchal de France, but in 1270, when the king, Saint Louis, went on his expedition to Africa, a second was appointed. Francis I. added a third; and the number has since been greatly increased.

The maréchaux de camp, in the old French service, were charged with the duty of arranging the encampment and providing subsistence for the troops; and in action they had the command of the wings or of the reserve of an army under the general-in-chief. From the title borne by this class of general officers is derived that of feld-marschall in the German armies; and from the latter title has arisen that which corresponds to it in the British service.

The number of British field-marshals is at present four—the dukes of Wellington and Cambridge, and the kings of Belgium and Hanover.

FIELDING, HENRY, born April 22, 1707, was the son of General Edmund Fielding, a descendant of the earls of Denbigh. He was nearly connected with the ducal family of Kingston, and thereby with Lady M. W. Montagu. Being designed for the bar, he was removed from Eton to the university of Leyden, where he is said to have studied with application; but owing to the limited nature of his finances, he was compelled to return to London, where he plunged into all the dissipation of the metropolis. His first resource as a means of support was writing for the stage; and between 1727 and 1736 he produced eighteen comedies and farces, none of which are now known or read, with the exception of two or three. This want of success may be attributed in part to the careless haste with which he appears to have written; but it is perhaps more probable, from the numerous instances of failure on record, that there is something in the qualities of a good novelist which render it almost impossible for him to become an admired playwright.

About the year 1736 Fielding married. His wife's portion and a small estate, inherited, as is supposed, from his mother, enabled him to retire from London; but his habitual extravagance again brought him into difficulties, and after three years he became a student at the Temple, with the view of retrieving his fortune at the bar. At the usual time he was called; but gout, the consequence of his early dissipation, rendered it impossible for him to practise with regularity sufficient to insure success. During the interval which preceded his call to the bar, he supported his family by pamphlets and essays on the passing occurrences of the day; and at this time two events happened which seem to have influenced the whole of his remaining career: the death of his wife, to whom he was fondly attached, and the publication of Richardson's novel of 'Pamela,' which gave him an opportunity to enter upon an employment which he found preferable to the study of law. He now wrote what professed to be the counterpart of 'Pamela,' the history of her brother, 'Joseph Andrews,' who undergoes a variety of trials of a kind similar to those which make Pamela's career so interesting. The whole book is intended as a satire on 'Pamela;' but the author visibly warms with his subject, and draws characters which perhaps none but he could have drawn in any case, and not even he himself had he kept his primary object distinctly in view.

The character of Parson Adams has been applauded and appreciated so often that it would be vain to say anything in its praise; Nichols ('Literary Anecdotes,' iii., 371) informs us, that it was taken from a clergyman named Young, and indeed it seems almost [illegible] that so peculiar a character should have [illegible] of imagination, for there is perhaps nothing so [illegible] a novelist as to draw singularity without allowing it to lapse into improbability and extravagance. Sir Walter Scott relates (*Life of Fielding*, pp. 95, 96,) that Richardson took mean and petty methods of revenging himself upon his successful satirist, by depreciating him before members of his own family, and by endeavouring to diminish his reputation as an author. Fielding however did not make reprisals, but contented himself with noticing Clarissa in a favourable manner, in a publication which he at that time conducted, called 'The Jacobite Journal.'

After the publication of 'Joseph Andrews,' Fielding wrote another play, 'The Wedding Day,' and a tract called 'The Journey from this World to the next,' which were followed by 'Jonathan Wild.'* The Rebellion of 1745 induced Fielding to take the direction of a paper called 'The Jacobite Journal,' directed against the party known by that name, and in support of the Hanoverian succession. This, with other publications of the same kind, at last obtained him a small pension and the place of Justice of the Peace for Middlesex and Westminster, which he is said to have owed to the influence of Lord Lyttelton.

Horace Walpole, with his usual mixture of foppery and snappishness, gives a very unfavourable account of Fielding's habits at this period, but his conduct as a magistrate proved a strong contrast to the usual iniquity of the so-called trading justices, one of whom he describes so forcibly in 'Amelia' under the name of 'Justice Thrasher.'

Amidst the laborious duties of a magistrate and pamphleteer, for Fielding was both at once, he contrived to produce 'Tom Jones,' a novel which for graphic description, originality of characters, and interest of the tale, has been and ever will be held in the very highest admiration. The publication of 'Tom Jones' was followed by some works on Poor Laws, in one of which, according to Sir Walter Scott, he appears to have struck out a scheme the same in principle with that which is now adopted. He also wrote a Charge to the Grand Jury of Middlesex and some Law Tracts.

'Amelia' was Fielding's last important work. It was published in 1751, soon after which time he was attacked by dropsy, jaundice, and asthma, and when all remedies had been tried in vain, the last remedy of self-banishment was proposed by his physicians. He left England for Lisbon June 26, 1754, and died there in October of the same year, aged 47, leaving a widow and four children.

Fielding has been styled, with perfect justice, the father of the English novel. Sir W. Scott observes that Richardson by no means succeeded in escaping from the trammels of the French romance. His characters have a strong touch of the impossible virtue and improbable heroism of that class of writing; and the length of 'Sir Charles Grandison' bears no small resemblance to 'Le Grand Cyrus.' But in Fielding's works we find the most perfect delineations of individual character—Squire Western, Tom Jones himself, Allworthy, and perhaps above all, Amelia and Mr. Abraham Adams, are portraits which proclaim their own truth. Every reader of Fielding must have been struck with the deficiency of individuality in his heroines. This arose, we believe, not so much from want of power in the artist, as from the low state of feeling then prevalent with respect to women, which placed them, while unmarried, in the light of a plaything; and when married, in that of an upper servant, or at most an humble companion. Such our author describes Mrs. Western to have been; and while this state of manners continued, it was impossible for any writer professing to give a true picture of the times, to attempt to invest his heroines with such mental attractions as are possessed by the female characters of modern novels. His waiting-maids and landladies are full of life and energy, which makes it still more improbable that his genius should not have been adequate to portray women of higher station.

Opinions have been much divided as to the tendency of Fielding's works. We have little hesitation in pronouncing it to be, on the whole, moral, and decidedly more so than that of Richardson's. It is true that scenes of extreme indelicacy occur, often very unnecessarily, but the manners of the time admitted allusions and even expressions at which we should now feel the greatest disgust. Squire Western addresses his daughter in terms and on subjects which would shock the ear of a modern waiting-maid, to say nothing of her mistress; and this under circumstances where no very grave annoyance was intended: but in spite of all this coarseness there runs through all Fielding's works an honest appreciation of right and wrong, with no attempt to

* Nichols ('Literary Anecdotes,' vol. iii. p. 396,) assumes that 'Jonathan Wild' preceded 'Joseph Andrews.' Chalmers enumerates it among his earlier works, "produced before his genius had attained its full growth," but it appears, from Sir Walter Scott, to have followed a miscellany which appeared in 1743, one year after the publication of 'Joseph Andrews.'

palliate bad actions by specious phrases. The character of Tom Jones seems to us not to have met with a fair share of praise. His generosity and nobleness of nature are, it is true, partially obscured by connexions of a degrading kind into which he so often falls; but however much he may fail of perfection, he cannot be called depraved. His love for Sophia is an affection of a kind which no thoroughly bad heart could entertain. He has all the materials of a fine character, and therefore there is no poetical injustice in marrying him to Sophia, and thereby putting him in a situation to redeem himself from the folly and vice into which he has been thrown.

'Amelia,' the author's last important work, bears the stamp of declining powers, with an appreciation of female character perhaps more delicate than we find in 'Tom Jones,' or 'Joseph Andrews.' Booth and Amelia are said to have been portraits of Fielding and his second wife; and 'if he put her patience, as has been alleged, to tests of the same kind, he has, in some degree, repaid her by the picture he has drawn of her feminine delicacy and pure tenderness.' (Scott's *Life of Fielding*.)

In summing up our opinion of Fielding's works, we should say that the chief fault is a want of unity in the plots. A novel is not a professed record of all which happens to any two people during a certain number of years. To make it perfect it requires extraordinary combinations tending to a certain end—the happiness or misery of the parties concerned. We do not reject these as improbable, but acknowledge them as constituting an integral element of the work. But we are not satisfied by a succession of petty annoyances and pleasures which have nothing to do with the conclusion of the tale. These rather disturb than interest our attention, and we would prefer being without them. But this is a minor fault, and very little seen in 'Tom Jones,' the author's best work, while we have, to counterbalance its truth and originality of delineation, skill in language, considerable dramatic power, and brilliancy of wit which has never been surpassed. (Sir Walter Scott's *Life of Fielding*; Nichols' *Literary Anecdotes*, vol. iii.; Chalmers' *Biograph. Dict.*; and Fielding's *Works*.)

FIERI FACIAS, a judicial writ of execution issued on a judgment obtained in a personal action in the king's courts. It is directed against the goods and chattels of the defendant, and is called a writ of *fieri facias*, from the words in it whereby the sheriff is commanded 'quod fieri facias de bonis,' &c., that he cause to be made of the goods and chattels of the defendant the debt or sum required. [EXECUTION.] It lies against privileged persons, as peers, &c., as well as other persons, and also against executors and administrators, so far as regards the goods of the deceased.

This writ, like all other writs of execution, being founded upon the judgment, must strictly conform to, and be warranted by, the terms of the judgment, or it will be void. By virtue of this writ, the sheriff may sell the goods and chattels of the defendant till he has raised enough to satisfy the judgment and costs, as well of the suit as of the execution; and also to satisfy any rent due to the landlord of the premises where the goods may be at the time of the taking, not exceeding one year's rent in the whole. If the goods of the defendant in the county where the venue was laid are not sufficient, a testatum fieri facias (as it is called) may be sued out, which is directed to the sheriff of any other county where there are goods of the defendant; and if the judgment is not satisfied by the sale of the goods of the defendant, the plaintiff may have a capias ad satisfaciendum for the residue. [CAPIAS.]

The sheriff is not justified in breaking open any outer doors to execute this writ, but having peaceably obtained entrance, he may break open any inner door belonging to the defendant in order to obtain possession of the goods. The clothes which the defendant actually has on or in wearing cannot be taken, and royal palaces are privileged against the sheriff's intrusion for the purpose of levying upon the goods of a resident therein.

Formerly it was necessary that writs of execution should bear teste or date, and be returnable in term time; but now, by stat. 3 and 4 William IV., c. 67, they may be tested, that is, dated on the day when issued, whether in term time or vacation, and may be made returnable immediately after the execution thereof.

If a fieri facias is issued against a clergyman, and the sheriff returns that he has no goods upon which the judgment can be levied, but that the defendant is a beneficed clerk not having any lay fee, the plaintiff may sue out a 'fieri facias de bonis ecclesiasticis,' which is directed to the bishop of the diocese, or to the archbishop during the vacancy of the bishop's see, commanding him to make of the ecclesiastical goods and chattels of the defendant within his diocese the sum therein mentioned. It is tested and made returnable exactly in the same manner as a common fieri facias, and is executed by means of a sequestration issued by the registrar of the diocese. [SEQUESTRATION.] (3 Bl. *Com.*; Archbold, *K. B. Pract.*)

FIESCHI. [GENOA.]

FIESOLE. [ETRURIA; FLORENCE.]

FIFE, a very small flute with never more than one key, and seldom that, giving acute piercing sounds, and used, together with the side drum, for military purposes, in marching, &c. It is an octave higher than the flute, and in compass comprises two octaves. Fifes are of three sizes, named the letters A, B, and C. The first is the lowest; the last, which is that in common use, is the highest.

FIFESHIRE is a maritime county on the east side of Scotland, comprising the peninsula between the Frith of Forth on the south, the German Ocean on the east, and the Frith of Tay on the north. On the west it is bounded by the counties of Perth, Kinross, and Clackmannan. It lies between 56° 3′ and 56° 25′ N. lat., and 2° 30′ and 3° 50′ W. long. The outline is very irregular. The extreme length of the county from north-east to south-west is about 45 miles. The area contains 504 square miles, or 322,560 acres, of which more than four-fifths are arable and pasture, and one-fifth consists of hills, moss, moors, roads, and woods.

General Appearance and Soil.—The county, when viewed from the loftiest summits, presents a pleasing variety of mountains, valleys, and plains. One of the two highest of the Lomond Hills on the west is 1720 feet above the level of the sea; the Largo Law on the east is 1020 feet; and the Norman Law on the north, 850 feet. A great number of noblemen's and gentlemen's seats appear in the midst of old plantations and extensive pleasure-grounds; and the scenery, on a closer view, exhibits deep, romantic, and well-wooded glens. Fifeshire is justly considered one of the best of the Scotch counties. It is well cultivated, has an unusual proportion of gentlemen's seats and plantations, and its coast is thickly studded with villages and towns.

Pennant, in his 'Tour in Scotland' in 1772 (part ii. p. 212), remarks that 'the peninsula of Fife is so populous that, excepting the environs of London, scarcely any part of South Britain can vie with it. Fertile in soil, abundant in cattle, happy in collieries, in ironstone, lime, and freestone; blest in manufactures, the property remarkably well divided, none insultingly powerful, but most of the fortunes of a useful mediocrity. The number of towns is perhaps unequalled in the same extent of coast, since from Crail in the east to Culross in the west, about 40 miles, they appear to form one continued chain.'

The soil is of various kinds. In the most fertile districts it consists principally of a rich loam: in the poorer tracts it is mostly a wet clay, resting on a cold bed of till. A level tract of deep, rich and very fertile loam extends from east to west along the whole southern side, varying in width from three miles to one mile from the shore of the Frith of Forth. It produces luxuriant crops of all the common kinds of farinaceous grain and esculent vegetables. A wide strip of land extending from the town of St. Andrews to the extremity of the county north-west of Dunfermline, consists of very wet clay, with moss, moor, and rocky hills. The western and north-western parts are also of little agricultural value, being partially covered with barren moor, and heathy mountain land. A valley called the Howe of Fife, drained by the Eden, commences at the mouth of that river and extends to the borders of Perthshire. From Cupar westward its width is from three to four miles. Its soil varies in different parts from a light friable and sandy mould to a strong and heavy loam, but the whole is generally well cultivated and very productive. The northern side of the county along the Frith of Tay exhibits a series of barren rocky hills partially covered with furze, yet intersected by numerous fertile valleys and carefully cultivated slopes.

Hydrography and Communications.—Fifeshire is watered by numerous streams, of which the Eden and the Leven are the chief. Fresh springs are found in almost every field. The small river Eden, which rises in the Lomond

Hills, flows about twenty miles east and north-east through the central vale, or Howe of Fife, past the town of Cupar, into an æstuary of the German Ocean. The stream is slow, and of little force; art, however, has made it available for the movement of mills and of powerful manufacturing machinery. [CUPAR.] Red and white trout, pike, and eels, are abundant in the deeper parts, and salmon are taken near its mouth. The Leven issues from Loch Leven, and taking an easterly direction, it receives the Orr Water from Loch Fitty, and flows into the Frith of Forth at the village of Leven. In a course of twelve miles it turns forty-five mills for cotton, flax, paper, corn, fulling, oil, &c. The water being very clear and soft is well adapted for bleaching. Before the establishment of bleaching fields along its banks, it was the best trout stream in the county. Fine salmon were taken in the loch, and thousands of eels in their passage thence to the sea. There is still a salmon fishery at the mouth. In May and June the eel fry come up the stream in millions, and when full grown in the loch and its marshes, they descend in September to the sea. Some of the numerous small lochs of this county have been drained, and their sites have become cultivated fields. Several of those which remain greatly improve the picturesque beauty of the scenery. The Loch of Lindores in the north-west is a beautiful sheet of water, covering seventy acres, and the depth is twenty feet. Loch Fitty, near Dunfermline, is the next in magnitude. There are mineral springs in various parts, particularly two chalybeates of great repute, near the town of Dysart.

About three-fourths of the county boundary are formed by the ocean and the great æstuaries or Friths of the Forth and the Tay; along this extensive line of coast there are many commodious little harbours. Steam-boats ply regularly between the principal ports of Fifeshire and those of the adjacent counties, especially with Leith on the south, and Dundee and Perth on the north. The principal roads in the county are those which, commencing at the small towns of Burntisland and Kinghorn opposite Leith, lead to Perth, Cupar, St. Andrews, and Dundee. During the last thirty or forty years all the roads have been much improved. The turnpikes are kept in good repair by parliamentary trustees.

Climate.—An extensively prosecuted plan of draining and forming enclosures has considerably ameliorated the climate, by clearing the atmosphere of malaria arising from stagnant water and decaying vegetation. The air in general is dry, healthy, and exhilarating. Many instances occur of great longevity. No peculiar epidemics appear. Agues are almost unknown, and fevers have a character comparatively mild: indeed no diseases are ever attributable to local causes. Along the coast of the Frith of Forth the air is particularly mild and salubrious, in consequence of the slight elevation of the surface above the level of the sea, the absorbent quality of the soil, and the shelter afforded by numerous plantations and enclosures: but in the west and north-west districts, which have greater elevation, with a soil wet, cold, and less cultivated, the air is comparatively damp and cold. From the hills of Fifeshire lying generally in a line from north-east to south-west, the valleys are much exposed to severe easterly and north-easterly winds. But the greatest inconvenience experienced by the agriculturist in this county, and in every part of Scotland, is occasioned by the frequent sudden changes in the weather.

Mineralogy, Natural Productions.—The county of Fife, in a geological point of view, is one of the most interesting in Scotland: it is rich in organic remains. Coal and limestone of the best description are found in abundance in almost every part of the county south of the Eden; but they are not found in the upper division, north of this river. Along the shore of the Frith of Forth, from Torryburn in the west to Pittenweem in the east, the strata of coal are generally regular, dipping to the east and south-east. They terminate on the one hand at the distance of two or three miles from the water edge, and on the other they are continued beneath it. Another tract of coal, to the north of this, extends through the higher ground, nearly parallel, from the north of Dunfermline to Leslie, and thence to the parish of Denino, a little to the south of St. Andrews. The dip of these strata is almost invariably north and north-east. In the irregular hills along the southern bank of the Eden the strata are found in every variety of position, cropping out and dipping towards opposite points of the compass. The collieries are numerous, and some are very extensive, and employ a large number of hands. The working of those at Dysart commenced about 350 years ago. Some are about seventy fathoms below the surface. The extensive Fordel coal works, in the parish of Dalgety, are the most valuable in the western part of the county. The pits are [illegible] feet in depth, and have been wrought nearly 240 years.

Limestone quarries are numerous in various parts of the southern district. The lime works of the Earl of Elgin, three miles east of Torryburn, are perhaps the most extensive in Scotland, yielding annually above 100,000 tons; also in the parish of Burntisland, six miles east of Dunfermline, and in many other places, inexhaustible quarries are constantly worked.

Ironstone is plentifully obtained in several parts of the coal fields, especially near Dysart, and in the parish of Balgonie. It yields from 40 to 60 per cent. of metal, and several thousand tons are annually conveyed to the great foundry of the Carron Company. Lead mines have been worked in the Lomond Hills.

Freestone of a superior quality is found in great abundance south of the Eden, particularly at a fine quarry in the parish of Burntisland. An extensive bed of dark-red freestone, well adapted for paving, is quarried in the parish of Strathmiglo, and near Dunfermline and north of the Lomond Hills there are vast rocks of white freestone, susceptible of a fine polish, and especially suitable for mantel-pieces and similar ornamental work. Along the sides and summits of the northern hills there are boulders of the primitive rocks—granite, gneiss, quartz, mica-slate, with garnets and primitive green-stone: many of these are of very large dimensions.

Whin or green-stone is very abundant, especially in the northern parts; it is generally hard, firm, and very durable; and, when neatly dressed, is an excellent material for the construction of houses. On the shore near Burntisland, and in some other places, are found beds of a hard dark-coloured stone, which endures exposure to the most intense heat for several years without waste or injury; it is therefore much used for grates and ovens. Marl of a rich quality is found in some places very near the surface, but it is not much used by the farmers for manure. Clay is abundant for making bricks, not only of the common kind, but of fire-bricks of an excellent quality. Peat in some parts is plentiful. Agates and very beautiful crystals of carbonate of lime and sulphate of barytes are imbedded in the whinstone rocks of Monimail and Newburgh; and agates, carnelians, jaspers, and brilliant rubies have been found in the bed of the Eden and at Earl's Ferry. In the parish of Dysart fossil trees and numerous other remains have been found embedded in the rocks. The antlers and skeleton of a very large elk were dug up a few years ago in a marl pit in the parish of Collessie.

There are a few patches of natural wood in Fife. The plantations are numerous, and the timber in them, which is mostly aged and valuable, consists of ash, elm, beech, fir of different kinds, limes, chestnut, sycamore, and oak. The largest plantations are those of the Earls of Crawfurd and Leven. They are also remarkably fine at Leslie-house in the parish of Leslie, where there is an avenue of beeches of large dimensions, about 200 years old. In recent times many hundreds of acres of waste land have been planted with forest-trees, the want of shelter being one of the greatest disadvantages of this county. In the single parish of Collessie 1240 acres have been covered, chiefly with firs. Owing to the great number of opulent proprietors who reside or have family seats in the county, gardens are numerous, extensive and well attended to, producing abundance of all the usual esculent vegetables and hardy fruits. Orchards are rare and only recently planted. Near Newburgh about 40 acres laid out in orchards are yielding supplies of excellent apples and pears.

Most of the indigenous and other animals of Britain, wild and tame, are found in this county. Game birds, especially pheasants, are abundant, and the lochs are visited by wild geese, ducks, teal, coots, and occasionally by wild swans. Among the rarer birds are the Bohemian and Silken Chatterers, the Siskin, Kingfisher, and Passenger-Pigeon.

Agriculture, Buildings, &c.—It has already been stated that four-fifths of the surface of this county are arable. Farms vary in extent, from 50 to 500 acres. The average may be about [illegible] acres. Property in land is perhaps more equally divided, and distributed among a greater number

of proprietors than in any other county of Scotland. The annual value of a large proportion of the estates is between 400*l.* and 3000*l.*, and a few from 3000*l.* to 6000*l.* A much greater number range from 40*l.* to 400*l.* a-year. The number of heritors paying cess taxes exceeds 1200. In the agricultural survey published in the year 1800 an enumeration is given of 175 elegant mansions, and since that period several hundred thousand pounds have been expended in new erections and architectural improvements.

Fifty years ago most of the rural dwellings and farmsteads were of the most wretched description. The farmers usually lived in low, smoky, badly-lighted cottages, without any interior divisions except those made by the furniture. The greater number of these have been replaced by neat and commodious houses, and the farm offices, which formerly were awkward and filthy, have given place to greatly improved structures. By far the greater portion of the county is now enclosed, and the fences consist either of stone dykes or thorn hedges. Drainage having been very extensively and effectually executed on tracts of flat and swampy lands, has greatly improved the appearance, productiveness, and health of the county, and the sites of several considerable lakes are now bearing the finest crops of grain. But much improvement in agriculture still remains to be accomplished, especially on the western side of the county, where enclosures are yet only partial.

Crops.—The principal crops are of oats, wheat, and barley. As oats are more generally adapted to the soil and climate, the cultivation is more extensive than that of any other kind of grain, and though the poorest families now eat wheaten-bread, oatmeal is still much used among this class of the people as an important article of food in the form of cakes, of porridge, eaten with milk or small beer, and of a pudding called *sowens*, which consists of meal obtained from the bran by steeping it in water, whence it acquires an acid flavour from the process of fermentation. Thirty or forty thousand acres are annually sown with oats, and they are generally found to be a very profitable crop.

About 20,000 acres are annually appropriated to the cultivation of barley. The meal of this grain is used for bread among some of the poorer class of labourers, who sometimes mix it for this purpose with pea and oat-meal. Of the quantity exported a considerable part is in the form of pot or pearl barley; but by far the greater proportion of the produce is consumed by the breweries and distilleries in the county.

The annual crops of wheat occupy from 8000 to 10,000 acres. This valuable grain is well adapted only to some parts of the soil, and requires more care and expense than oats and barley; the crops however are generally very fine and profitable. The exportation of oats, wheat, and barley, is carried on chiefly at the port of Kirkaldy.

Peas and beans, which occupy about 7000 acres annually, are found to thrive best in the northern and southern districts. In the midland and western parts the crop is more scanty and precarious. Much of the produce is exported, and the rest is consumed in the county chiefly as food for horses and hogs.

Potatoes, a hundred years ago, were cultivated only in the gardens of a few of the rich proprietors. Since the introduction of this useful root the county has not experienced the extremes of scarcity approaching to famine to which it was previously subject. At present, potatoes constitute one-third of the food of the poorer people during eight months of the year. On every farm a sufficient quantity is planted for the tenant and his cottagers, and abundant supplies are raised in the vicinity of every town and village. The number of acres annually appropriated to this crop may be about 6000 acres. Some cargoes of them are exported to the London and other markets.

Turnips are extensively used for fattening cattle, and feeding milk-cows and young stock in sheds. Sheep are not so commonly fed upon them. They probably occupy annually about 5000 acres.

Flax in Fifeshire is an important crop, occupying annually about 2000 acres; the produce is consumed in the large linen manufactures of this county, principally at Dunfermline.

Rye, cabbage, colewort, kail, tares, and carrots are cultivated to a small extent on particular farms. The number of acres in meadow and pasture, including, besides arable land, commons, hills, and parks, is stated in the 'Agricultural Survey' to be at least 140,000 acres. Of this extent about 12,000 acres are annually under rye-grass and clover.

Lime being abundant and cheaply obtained, is very generally used for manure. Compost dung-hills are very common, and in a smaller degree marl, peat, coal-ashes, and sea-weed are applied to certain soils and crops.

For particulars concerning the rotation of crops, which is very various in different parishes, see *The New Statistical Account of Scotland*, Nos. X. and XIII.

The county of Fife has been long distinguished for the excellence of its breed of black cattle. The prevailing colour is black, though in the true county breed every variety of colour is found. The body has a round and bulky form. The bone is small in proportion to the carcase. The limbs are short and well proportioned; the skin soft, and the horns small, white, bending forward, and erect at the points. The head is small, but very full about the ears and throat, and finely diminished at the muzzle. They are hardy, fleet, travel well; are tame, docile, and excellent for work in the plough or cart, and they fatten quickly and fill up well at all the choice points. When fat, they bring a much higher price at Smithfield market than any other kind, and are selected by the English butchers for the tables of their most luxurious customers. A Fife bullock will often bring a higher price in the London market than an English one ten stone heavier and equally fat. The Fife cows are also of high repute in the dairy. The best give from five to seven gallons of milk per day. They are usually milked thrice in the day. Calves are sometimes partly fed on hay-tea and oatmeal-gruel. The number of milk-cows in Fife at the time of the 'Agricultural Survey' (1800) was stated at 10,000, and the whole stock of black cattle at upwards of 60,000. The Ayrshire, Teeswater, and some English breeds have been, it is thought, injudiciously introduced, since none possess qualities superior to those of the native breed. Sheep are not very numerous in Fife, but recently a large number have been slaughtered at Kirkaldy and sent by the steam-vessels to London. The flocks are small, chiefly of the Cheviot breed. Hogs, though not considered as a primary article of farming stock, have lately become very numerous; and are kept by all the farmers and cottagers for the domestic supply of pork and bacon. A few cargoes of them are exported to the London and other markets. The breed of horses, which formerly were small, unsightly, and ill suited either for saddle or harness, has been greatly improved. All kinds of poultry and pigeons are abundant and skilfully reared. Modern improvements in agricultural implements are adopted throughout the county. Thrashing-machines, some of which are driven by steam, iron ploughs, &c., are in common use. The average rent of land in 1810 was 22*s.* 5*d.* per acre. Farm leases are generally for 19 years. Labourers' wages are generally about 1*s.* 6*d.* per day for men, and 9*d.* for women, and many are paid with provisions instead of money. There are several active agricultural societies in the county.

Manufactures and Commerce.—Small breweries and distilleries for the manufacture of malt liquor and malt spirits are numerous. About twenty flour-mills are employed in grinding wheat and oats, and not less than 25,000 cwts. of pot-barley are manufactured, chiefly for home consumption. The southern side of Fifeshire being washed by the sea, and abounding in coal, is most advantageously situated for the manufacture of sea-salt: accordingly this business has been here established for several centuries, chiefly at Dysart, Kirkaldy, and at several other places on the coast. The annual quantity manufactured is about 100,000 bushels. The annual produce of the coal-fields in the western parishes of Aberdour, Dalgety, Inverkeithing, and Dunfermline, is about 230,000 tons. Fordel Colliery yields annually 70,000 tons. About 10,000 ox and cow hides, as many calf-skins, and some seal-skins, are annually tanned and dressed at Kirkaldy, Cupar, Auchtermuchty, and Falkland, for which are consumed annually about 600 tons of oak-bark. About 300,000 pounds of soap are manufactured, and 200,000 pounds of candles. At Cupar, Kirkaldy, and Leven about 800,000 bricks and tiles are made annually, and at Burntisland a large quantity of vitriol is manufactured. At Dysart, forty years ago, about a hundred smiths made annually twelve millions of nails, value 2000*l.*, but this manufacture is now almost wholly discontinued.

The manufacture of linen is more extensive and valuable, and employs a much larger number of hands than

any other in the county. The different kinds of linen goods manufactured are damasks, diapers, checks, ticks, Osnaburgs, and Silesias or brown linens, besides plain linen of various fabrics for shirting and other domestic purposes. Damasks and diapers are made chiefly at Dunfermline. [DUNFERMLINE.] Checks and ticks are manufactured principally at Kirkaldy, Dysart, and their immediate neighbourhood. Silesias, Dowlas sheetings, Osnaburgs, window-blinds, &c., are made in great quantities in Newburgh, Abbotshall, Auchtermuchty, Monimail, Falkland, Cupar [CUPAR], Kettle, Strathmiglo, Leslie, Markinch, Kennoway, Leven, Largo, East Wemyss, King's Barns, and by numerous individual weavers scattered in every part of the county. The following statements of the parochial clergymen relating to some particular places are taken from the 'New Statistical Account of Scotland.' In the parish of Monimail the value of the labour employed in the linen manufacture is about 3000*l*. per annum. The hours of work are very long, allowing little time for relaxation. The Dowlas shooting manufactured at Newburgh finds a ready market in London, Leeds, Manchester, and in the West Indies and South America. Thirteen master-tradesmen employ all the weavers in Newburgh, and in probably twenty other towns and villages. The value of the finest fabric is about 6*l* per web of 140 yards 1 yard wide, and about 24*l* when the width is 3 yards. The number of hands in Newburgh employed in winding bobbins is about 350; looms, 570, number of webs annually manufactured, 24,000—containing 830,000 spindles of yarn, of which the cost, including bleaching, is about 130,000*l*. In the parish of Kettle the number of looms is 380: average wages received by the weavers 4*s* 6*d*. per week. In the town of Leslie there are 260 weavers; the best earn one shilling per day by working 12 or 14 hours. Six flax-mills in the parish employ between two and three hundred hands, 12 hours every day, average daily wages of men 2*s* 6*d*. and 3*s*; of women about 10*d*; and of boys and girls about 4*d*. Three bleachfields employ 140 men and women 10 hours per day, men's daily wages 1*s* 8*d*, women's 10*d*. The workers in the mills present a far less healthy appearance than the bleachers, though of late the requisite attention has been given to the ventilation of the rooms. In the parish of Dysart about 2090 looms are employed in making checks and ticks. The annual quantity manufactured is about 31,007,000 yards, value not less than 150,300*l*. It is sent to Glasgow, London, Manchester, Liverpool, Nottingham, and Leeds, to the Cape of Good Hope, and to the East and West Indies. Between five and six thousand hands are employed in the parish, in weaving, winding, &c., and the number of looms employed out of the parish exceeds 1000. Some of the weavers work from four or five o'clock in the morning until ten or eleven at night to earn 10*d*. or 1*s*. per day, which of course is very injurious to both the body and mind. At the mill where flax is spun the work people are employed from half-past five in the morning to eight at night, the women earning from 1*s* to 1*s* 2*d*. per day. (*New Statistical Account of Scotland*, No X., p 139.) It is estimated that, in the flax-mills of this county, 2210 persons are employed, and that they manufacture 6500 tons of flax, the value of which is 438,750*l*.

Fisheries.—Besides considerable salmon fisheries in the rivers Leven and Eden, and at Newburgh, the herring fisheries along the north-eastern, eastern, and southern coasts are extensive, and large exportations of the produce are made, especially from the ports situated between St. Andrews and Inverkeithing. Cod, turbot, haddock, and the other common species of sea-fish are taken off the eastern coast, and conveyed to the market of Edinburgh.

Shipping.—The shipping belonging to the small ports of Fifeshire consists chiefly of brigs and sloops for the coasting trade, as the contiguity of the great ports of Leith and Dundee affords the convenience of steam conveyance to London and other distant places. There are however a considerable number of vessels engaged in the Baltic, American, and Australian trade, and a few are employed in the Greenland whale fishery.

Antiquities.—This county once formed a part of the district which, being bounded on the north and south by the Tay and the Forth, and extending from the Ochil hills on the west to the German ocean on the east, was called Ross, which, in the Gothic or Pictish language, signifies peninsula. Hence the part now comprising the county of Kinross was anciently called Kean-ross, head of the peninsula. So Culross signifies back of the peninsula, and Muckross, the old name of Fifeness, means the point or snout of the peninsula.

The origin of the name of Fife has puzzled all the antiquarian writers on this part of the county. The monkish chronicles attribute it to Fifus Duffus, a chieftain who rendered eminent services in the wars of the Caledonians. This county originally, like all the surface of Scotland, was one continuous forest, varied only by swamps and tracts of furze and heath overrun with ferocious wolves and other wild animals, especially boars of enormous size. The antient history of its people is involved in great obscurity. Prior to the eleventh century, this district was either the property or wholly under the jurisdiction of the powerful Thanes of Fife, who bore the family title of Macduff. Duncan Macduff was created first earl of Fife by King Malcolm Canmore (Malcolm the Third) at his first parliament held at Forfar about the year 1057. This Duncan being a man of great property and power, was much dreaded by the tyrant Macbeth. His influence disposed his countrymen to join the English who came with Malcolm Canmore, and the restoration of the latter to the crown of Scotland was accomplished by his important counsels. For these and other good services great honours and privileges were bestowed upon him. One of the most remarkable of the immunities granted by the king was connected with the curious cross of Macduff, hereafter noticed. Of Duncan Macduff, who is interesting as the ancestor of several existing families of the nobility and gentry of the county, and as being one of the most conspicuous characters in Shakspeare's tragedy of Macbeth, an elaborate account has been collected by the learned and voluminous antiquarian, Dr. Sibbald, from numerous monastic and other documents. This and similar accounts of the successive earls of Fife comprise chapter 1 of section 3 in the Doctor's topographical work, of which the full title is as follows—'The History, antient and modern, of the Sheriffdoms of Fife and Kinross, giving a description of both, and of the Firths of Forth and Tay, and the Islands in them, with an account of the royal Seats and Castles, and of the royal Burghs and Ports, religious Houses and Schools, and most remarkable houses of the nobility and gentry, and of the natural Products of the lands and waters, by Sir Robert Sibbald, M.D., new ed., Cupar Fife, 1803.' Chapters 4, 5, and 6 describe the language, customs, religion, &c. of the Caledonian and Pictish inhabitants of Fife, showing from Tacitus, Bede, and many other authorities that they were red-headed and big limbed (rutilæ comæ, magni artus). Chap 7 describes the invasion, domination, and remaining monuments and relics of the Romans, and in chap. 8 are described the wars and calamities caused by the invasions of the county by the Danes. After the termination of the jurisdiction of the earls, whose chief residences were at Cupar and Falkland, and whose courts had full powers to decide all civil and criminal questions, the most considerable jurisdiction was that of the sheriffs and stewards, and the bailliaries of the churchmen, and wherever the king had a seat there was a constabularium. Fifeshire was the district where the Scottish Presbyterian reformation commenced. The inhabitants were strenuous supporters of the Covenanters, and still remain staunch adherents of ecclesiastical Presbyterianism, which however differs virtually not much from the Episcopalianism to which it is nominally opposed. There are 63 parishes and as many Presbyterian churches, besides about 40 meeting-houses of Presbyterian dissenters, but only 4 episcopal chapels. The county forms an ecclesiastical synod, divided into 4 presbyteries.

This county contains a great number of antient edifices once the dwellings of powerful nobles, but now either fallen or falling into decay. Some of these ruins are truly magnificent, and are striking monuments of the taste and opulence of the feudal and monkish ages. In the town of St. Andrews the remains of several superb structures are still to be seen. [ST. ANDREWS.] In Dunfermline too there are vestiges of many antient buildings of great extent and magnificence. [DUNFERMLINE.] Near Newburgh, in the middle of a large and fertile field, rising gently from the margin of the Tay, stand the venerable ruins of the abbey of Lindores, clothed with clusters of ivy. It was founded by David, earl of Hunnington, in 1178, in commemoration of his taking Ptolemais in the Holy Land, was bestowed on the Benedictine monks, and was one of the most richly endowed monasteries in Scotland. Stately fruit trees rise from the floors of its once sacred halls and lofty aisles, in-

terspersed with ivy, hazel, and wild flowers of various and brilliant hues, which cling to the mouldering fragments of the walls. The whole produces a very picturesque effect. In the same neighbourhood are the remains of two very curious antient crosses. One, called the cross of Mugdrum or Magridin (a saint), consists of a pediment or plinth, with an upright shaft adorned with remarkable sculptures of animals and scrolls. (See an engraving and description in *The New Statistical Account of Scotland*, No. x., p. 68.) Many similar crosses, found in this and the adjoining counties, are traditionally assigned to the age of King Arthur, about A.D. 800. The other is the famous cross of Macduff, on the Ochill hills, overlooking the beautiful valley of Strathearn. It now consists only of one large block of freestone, forming the base of a sculptured shaft, which, in 1559, was destroyed by the mob of fanatic reformers on their way from Perth to the abbey of Lindores. It is surrounded by cairns and tumuli, containing, it is said, the remains of those who, having committed murder, fled to this cross, but failed in establishing their claims of kinship with the powerful thane, who made it a sanctuary for his family; and the neighbouring rustics relate how benighted travellers have heard the shrieks of their ghosts. The following lines from Sir Walter Scott's poem on this interesting monument are finely descriptive:—

'Mark that fragment,—
I mean that rough-hewn block of massive stone,
Placed on the summit of this mountain-pass,
Commanding prospect wide o'er field and fell,
And peopled village and extended moorland,
And the wide ocean and majestic Tay,
To the far distant Grampians. Do not deem it
A loosened portion of the neighbouring rock
Detached by storm and thunder—'twas the pedestal
On which, in antient times, a cross was reared
Carved with words which foil'd philologists:
And the events it did commemorate
Were dark, remote, and undistinguishable
As were the mystic characters it bore.'

The wondrous words here alluded to have been preserved by Sir James Balfour, the celebrated annalist, as follow:—

'Maldraradum dragos, mairia, laghslita, largos
Spelando spados, sive nig fig Knighthite gnaros
Lothes leudiscos lamringen buria liscos
Et colovurtos sic fit tibi bursia burtus
Exitus, et bladadrum sive lim sive lam sive labrum.
Propter Magridin et hor oblatum.
Accipe smeleridem super limthide lamthida labrum.'

Mr. Cunningham, in his learned Essay on this singular inscription, considers the words with which the Latin is intermixed as Saxon Latinized; and the writing he believes to be a charter from Malcolm Canmore to Macduff, in virtue of which the latter reigned over 'the kingdom of Fife' by a tenure similar to that by which the famous Hugh Lupus held from William the Conqueror the government of the county of Chester.

Besides the abbey of Lindores, there are remains of many other religious houses, as the abbeys of Inchcolm and of Balmerino, the priory of Pittenweem, &c., for descriptions of which we refer to Grose's 'Antiquities,' Dr. Sibbald's 'History of Fife,' and 'The Beauties of Scotland,' vol. iv. The large palace or castle of Falkland deserves particular notice. It was one of the seats of the Macduffs, the thanes of Fife. By King James V. it was greatly enlarged and ornamented, and made a royal residence; being pleasantly situated in the midst of a fine country for the enjoyment of deer and boar hunting. The south front is yet entire, and partly inhabited. In the parish of Monimail stands an old tower, known as Bethune's or Beaton's Tower. It formed part of the palace of the archbishops of St. Andrews, and in 1560 was the residence of Cardinal Bethune, who is several times distinctly represented on the walls in rilievo with his cap on, together with the arms of the Bethune family. The castle of Rosythe, near Inverkeithing, stands on a rock surrounded by the sea. It consists of a large square tower, in the midst of the ruins of an extensive pile of buildings. Sculptures and inscriptions remain on some of the interior walls. The castle of Loch Orr stands in the middle of this loch, in the parish of Balingry. It was built in the time of Malcolm Canmore, and consists of a tower and other buildings surrounded by a strong wall. The ruins formed a beautiful object in the lake before it was drained. Seafield Tower is an old ruin on a rock by the shore, in the parish of Kinghorn. The castle of Ravenscraig stands also on a precipitous crag projecting into the sea, in the parish of Dysart. It was inhabited in the time of Oliver Cromwell, and has been the scene of romantic legends. Macduff's Castle at East Wemyss stands on a high cliff overlooking the sea. Two square towers and some of the surrounding wall still remain. There are several other castles of Macduff in other parts of the county. Craig Hall, in the parish of Ceres, is an extensive ruin on the bank of a beautiful glen filled with luxuriant trees. It was the seat of Sir Thomas Hope, Charles I.'s advocate. In the same parish is Tarvet Tower, a beautiful old fabric of hewn stone, 24 feet square and 50 feet in height. It stands on high ground, and is seen at a great distance. From the battlement on the top, the great thickness of the walls, and smallness of the windows or loop-holes, it appears to have been a place of refuge and defence. Balgonie Castle, in the parish of Markinch, is a fabric of great antiquity and strength, built probably in the twelfth century, with the castle of Loch Leven, which it much resembles. It stands on the south bank of the river Leven, about 40 feet above the water. An embattled tower, 45 feet by 36, rises 80 feet in height, in a quadrangular court, with other buildings, surrounded by a wall and ditch. The ruins of the tower of Balwearie, in the parish of Abbots Hall, are interesting, as having been the residence of the famous sage, prophet, or wizard, Sir Michael Scott. The walls are nearly 7 feet in thickness. On the battlements, which were about 60 feet from the base, tradition describes the white-haired old man as accustomed to sit at midnight watching and conversing with the stars. He was born at this place in the beginning of the thirteenth century, and became a great proficient in mathematics, scholastic theology, medicine, alchemy, astrology, and divination, by studying successively at the universities of Oxford, Paris, and Padua, and in Germany and Norway. He is celebrated in Dante's 'Inferno,' canto 20, and in Sir Walter Scott's 'Lay of the Last Minstrel.'

In this county are found a remarkable number and variety of the vestiges of the Caledonian and Pictish inhabitants, and of their Roman and Danish invaders, antient military forts and mounds of encampment, groups of Druidical lithoi, cairns, tumuli, barrows, stone-coffins, skeletons, Celtic sepulchral urns, spear and arrow heads of flint, swords and battle-axes of brass and bell-metal, crosses, fonts, beads, Roman and other coins, weapons, &c. One of the small conical hills called cairns, opened not long ago in the parish of Scoonie, contained, besides a large quantity of loose human bones, twenty stone coffins, formed with rough slabs cemented with clay. They held some mouldering skeletons and small Celtic urns of clay filled with calcined bones. A finely ornamented stone font, sculptured with numerous coats of arms of the antient families, has been disinterred in the parish of Inverkeithing. It may be here also mentioned that the roof and walls of Earl's Hall, a venerable old edifice in the parish of Leuchars, are crowded with sculptured arms, crests, and inscriptions. In the same parish an urn, containing about 100 perfectly preserved silver coins of the Roman emperors, was turned up by the plough. Part of the church in this parish was built about the year 1100, and exhibits the most interesting specimen in Scotland of the Saxon style of architecture. The mansion of the earl of Rothes at Leslie contains curious and valuable collections of old manuscripts, paintings, and tapestry. In Chambers's 'Picture of Scotland' (2 vols. 8vo. 1827, pp. 163-225) there are notices of the most picturesque objects and interesting historical and legendary facts connected with the abbey and palace of Dunfermline, Falkland palace, the Valley of the Eden, or Howe of Fife, the castle and colleges of St. Andrews, Ravenscraig castle, &c. From Dunikier Law, and several other elevated points, the view extends beyond the county on every side.

Among the eminent individuals who have been natives of Fifeshire may be mentioned Sir Robert Sibbald, the antiquary; Dr. Andrew Marshall, distinguished in medicine and anatomy; Bishop Sage, a learned ecclesiastical writer; Robert Adam, an eminent architect; Dr. Watson, who wrote the life of Lord Gordon; Professor Tennant, of the university of St. Andrews, a distinguished oriental scholar; Admiral Greig, whose abilities raised him to the chief command of the Russian navy. Dr. Pitcairn was a native of Leslie. Dr. Adam Smith was a native of Kirkaldy, where not only the house but the room is shown in which he composed 'The Wealth of Nations.' It was in the parish of Leslie that, when a child, he was accidentally left in the fields and stolen by gipsies. Leslie Green is said by Allan

Ramsay to be the scene of King James the Fifth's poem of 'Christ's Kirk on the Green.'

Chief Towns.—Cupar is the county town. The two other principal towns are Dunfermline and St. Andrews. The former is important as a populous centre of the linen manufacture, the latter as the seat of the oldest university in Scotland. Of these three places separate descriptions are given under their respective names. The number of smaller towns and villages is about 40, lying chiefly on the line of coast. A detailed description of each is given in *The New Statistical Account of Scotland.* There are 13 royal burghs, namely, St. Andrews, East and West Anstruther, Burntisland, Crail, Dysart, Inverkeithing, Kilrenny, Kinghorn, Kirkaldy, Pittenweem, Cupar, and Dunfermline. All these, with the exception of the two last, are sea-ports; but in general they have greatly declined from their antient prosperity, and are now comparatively in a state of decay, a fact which is owing partly to their having originally possessed, like all other royal burghs, an exclusive privilege of trading, but principally to the union of Scotland with England, after which all the towns on the coast of Fife experienced more or less depression and loss of trade. The population of these burghs, including their respective parishes, is, according to the census of 1831, as follows:—

Anstruther, burgh and parish, 1437; Burntisland, do., 2366; Crail, do., 1824; Cupar, do., 6473; Dunfermline, do., 17,068; Dysart, do., 7104; Inverkeithing, do., 3189; Kilrenny, do., 1705; Kinghorn, do., 2579; Kirkaldy, do., 5034; Pittenweem, do., do., 1317; St. Andrews, do., 5621.

The whole population of the county in 1831 was 128,800. The increase in the decennial period from 1801 to 1811 was 8 per cent.; from 1811 to 1821, 13 per cent.; from 1821 to 1831, 12 per cent.

Dysart is a small antient town on the Frith of Forth, consisting of three narrow streets, of which the central, or high street, is full of substantial old houses, ornamented with inscriptions, dates, and piazzas under which the merchants in olden times exposed their goods for sale. It was made a royal burgh about the year 1500, but even in 1450 its salt-works were of great extent, and supplied the principal places in Scotland and Holland. Commerce, domestic and foreign, was then carried on to a great extent, and its markets exhibited a very superior degree of mercantile wealth and activity. At present the harbour is one of the best on the coast. There is also a wet-dock, but the shipping consists of only a few brigs and sloops engaged principally in the exportation of coal, corn, and other agricultural produce. A flax-mill and earthenware factory give each employment to about 100 persons. The manufacture of linen has been already noticed. On the east of the town are the Red Rocks, the scene of superstitious legends of the burning of witches. Sir Walter Scott, in his 'Tales of a Grandfather,' has largely used a MS. possessed by the earl of Rosslyn, respecting the antiquities of Dysart. Some memorials are preserved of Oliver Cromwell, whose army was quartered in this town. A curious observation made by the colliers and miners here, is that, some hours before a storm of wind and rain, a sound comes from the strata in the coal-pits and ironstone works resembling the drone of a bagpipe, or the loud humming of a bee, accompanied with a 'black damp' at the bottom of the pits which extinguishes the lamps. Inverkeithing is a small market and post-town near Dunfermline, at the bottom of a bay, which occasionally affords a safe asylum for large vessels lying in the Leith roads. It consists chiefly of one street; is very antient, was the royal residence of David I., and was made a royal burgh by William the Lion. In conjunction with Culross, Queensferry, and Stirling, it sends one member to parliament. Its coasting trade and maritime commerce are similar to those of the burghs already mentioned. Kilrenny, Anstruther, Pittenweem, and Crail, are small seaports and fishing towns not requiring particular notice, though in common with the other royal burghs many interesting facts are connected with their local history and antient prosperity. They unite in sending one member to parliament. The same remarks apply to Kinghorn and Burntisland, which jointly with Dysart and Kirkaldy return one member to parliament. Kirkaldy merits especial notice as a place of considerable commercial importance. It was antiently a seat of the religious order called Keldees, or Culdees (see Toland's *Nazarenus*, last chap.), whence the formation of its name by the prefixture of the word kirk. It belonged to the abbots of Dunfermline as a royal burgh in the year 1334. Charles I. in 1644 made it a free port with additional privileges and jurisdiction. At this period it possessed 100 ships, and the population was much larger than at present. It is pleasantly situated on the shore of the Frith of Forth, forming one handsome street nearly two miles in length, which has near its northern extremity the large village of Pathhead whose population exceeds 3000. Kirkaldy of late years has received many additions and improvements in houses and public buildings. It has an elegant modern-built church and town-house; with assembly-rooms, masonic lodge, subscription library, reading-rooms, and public grammar-school, and is lighted with gas. The market is well supplied, and many visitors resort to the town as a bathing place. The harbour has been rendered very commodious. Of the single article of coal about 50,000 tons are annually shipped, chiefly to places on the coast of Scotland. Corn, potatoes, sheep, and pigs also form large items of exportation to London and various other ports. There are several flax-mills, an extensive manufacture of coarse linen fabrics, an iron-foundry, tanneries, a large whisky distillery, several salt-works, breweries, &c. The harbours of Ellie and Newburgh on the Tay are safe and commodious, and the little town of Newburgh is an active and improving place of commerce.

Divisions, Fairs, &c.—The county is divided into 61 parishes. A neat and accurate map of these parochial divisions is given in the 'New Statistical Account of Scotland,' No. 13. For ecclesiastical purposes it is divided into four presbyteries, namely, St. Andrews, Cupar, Kirkaldy, and Dunfermline, so called from the presbyters being appointed to meet at these places. In all the towns and large villages numerous fairs and markets are held throughout the year, for the sale of agricultural stock and produce of every kind, as well as for all articles of domestic consumption, and implements of agricultural and manufacturing industry. The stated fairs in the county amount to 87; namely at Cupar, 8; at Dunfermline, 8; at Falkland, 8; at Leven, 7; at St. Andrews, 6; at Inverkeithing, 5; at Cross-gates, 5; at Dysart, 4; at Auchtermuchty, 4; at Anstruther, 3; at Galine, 3; at Leuchars, 2; at Leslie, 2; at Kilconquhar, 2; at Kinglassie, 2; at Pittlessie, 2; at Ceres, 2; at Colinsburgh, 2; at Kirkaldy, 2; at Kinghorn, 2; at Newburgh, 2; at Strathmiglo, 2; at Pathhead, 2; at Torryburn, 1; at Wemyss, 1.

The courts for trial of crime and civil suits are—1, the burgh courts; 2, the sheriffs' courts; 3, the courts of the justice of peace.

The county sends one member to parliament and the burghs, as above stated, send three. The annual value of real property, as assessed in 1815, was 405,770*l.*, and the valued rent 363,192*l.*

Education.—In this county, as in almost every other in Scotland, the means of elementary instruction are so generally established and so efficiently administered in every parish, that it is very unusual to find an instance, even among the poorest classes, of inability to read and write. According to the parliamentary reports on education in 1818 the number of parochial schools in the 61 parishes of Fifeshire was 71, of which the annual revenue was 1430*l.*, and the number of children taught in these schools was 3898. There were also of unendowed day-schools 132, teaching 6071 scholars, and of unendowed Sunday schools 59, attended by 2592 children. A general view of the present state of education in the whole county is not obtainable from the 'New Statistical Account of Scotland,' as reports of only about half the parishes are yet published; but on comparing with former accounts the reports of some particular parishes which have already appeared, the extension of education is evident, and a progressive improvement in the moral character of the people appears to be equally evident. Some of the parishes enjoy the advantage of several large donations from wealthy philanthropists for the promotion of education: thus, Mr. Robert Philip bequeathed about 80,000*l.* to Kirkaldy and three adjoining parishes for this purpose. Greek, Latin, Mathematics, and the modern languages are taught in many of the parochial schools. Subscription and circulating libraries, containing several hundred volumes, are not uncommon in the small towns and villages. However, in many parishes, especially where distilleries are established, public-houses for the sale of intoxicating liquors are very numerous. In the small parish of Dysart the number is 150. Several Savings' Banks in the county are well encouraged. No compulsory assessments are made for the relief of the poor. They are supplied solely from church

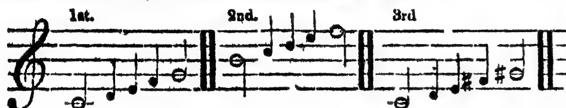
collections and the interest of funded donations. (*New Statistical Account of Scotland*; Dr. Thompson's *Survey*, Dr Sibbald's *History*, *Beauties of Scotland*, vol. iv, Chalmers' *Caledonia*, MacCulloch's *Statistics*, Pennant's *Tour*; *Parliamentary Returns*, &c)

FIFTEENTH, in music, is the interval of the double octave

The *Fifteenth Stop* in organs, is a range of metallic pipes, tuned two octaves higher than the diapasons

FIFTH, an interval in music, and the most perfect of concords, the octave excepted. Its ratio is 3 2 [CONCORD, HARMONY]

There are three kinds of Fifths, the *Perfect Fifth*, the *Flat* or *Diminished Fifth* (called also the *Imperfect Fifth*), and the *Extreme Sharp* or *Superfluous Fifth* The first (C, G) is composed of three whole tones and a semitone, the second (B, F) of two whole tones and two semitones, the third (C, G♯) of four whole tones Ex —



FIFTH MONARCHY MEN, a sect of religionists, whose distinguishing tenet was a belief in the coming of a fifth universal monarchy, of which Jesus Christ was to be the head, while the saints, under his personal sovereignty should possess the earth They appeared in England towards the close of the Protectorate, and in 1660 a few months after the Restoration, they broke out into a serious tumult in London under their leader Venner in which many of them lost their lives, some being killed by the military, and others afterwards executed Several Fifth Monarchy Men also suffered death in 1662, on a charge (most probably unfounded) of having conspired to kill the king and the duke of York, to seize the Tower, &c They are the same who were sometimes called Millennarians their notion being that the reign of Christ upon earth was to last for a thousand years They seem also, from the extravagance and violence of conduct into which they occasionally broke out, to have been confounded in the popular imagination with the old Anabaptists of Munster [ANABAPTISTS]

FIG, the *Ficus Carica* of botanists, is a small tree with rough lobed, deciduous leaves, naturally inhabiting the temperate parts of Asia, and now commonly cultivated in Europe for the sake of its fruit

In the fertile islands of the Mediterranean, in Spain, Italy, and Greece, and even so far north as the south of France, the fruit is so well ripened as to form a valuable article of exportation in a dried state A thousand tons are annually imported into Great Britain alone The fruit is grown with some success even in the southern and milder parts of England, but it is seldom found in the northern parts or in Scotland, except under glass It is only as an object of cultivation in this country that we have to consider it in this place

The nomenclature of figs is in a greater state of confusion than that of most other fruits, and the descriptions of them generally so imperfect that the same kind is grown in different parts of the country under many different names, an account of their synonyms, as far as they have been determined, will be found in the Horticultural Society's Fruit Catalogue, ed. 2

The following is a list of the best sorts —

Black Provence.	Green Ischia
Large Blue.	White Ischia
Brunswick	Yellow Ischia
Blue Burgundy	Lees perpetual
Early White.	White Malta.
Large white Genoa	Large black Naples
Hamburg Brown.	White Naples.
Black Ischia.	Small Green
Brown Ischia.	Brown Turkey

The best sorts for forcing are—

The Ashridge Forcing.	Neri. (This excellent sort will not bear a high temperature)
Figue Blanche.	
Early Forcing.	
Marseilles.	Pregussata.

The following kinds are recommended as a selection for a small garden in the southern and midland counties of England.—

Black Ischia	Large white Genoa.
Brown Turkey.	Marseilles
Brunswick	Small early White
White Malta	

The following sorts have been recommended for a succession from August to October in the south of England.—

Brown Ischia,	ripens in the middle of August
Large white Genoa,	end of August
Green Ischia,	beginning of Sept.
Murrey, or brown Naples,	middle of Sept
Ford's Seedling,	end of Sept
Black Provence,	beginning of Oct
Yellow Ischia,	middle of Oct
Gentile,	end of Oct

The most approved methods of propagating fig-trees are either by layers or cuttings, but the former method is generally preferred because the plants at the end of the season are stronger and more fit to be planted out where they are intended to grow Trees raised from layers generally come into bearing the second year Grafting succeeds upon these trees as well as upon any other, but it is almost unnecessary and seldom practised Before the trees are planted the ground should be well drained and made from two feet and a half to three feet deep, with a mixture of good friable loam and decayed dung Miller remarks, that 'Fig trees bear the greatest quantity of well flavoured fruit when growing upon chalky land where there has been a foot or more of a gentle loamy soil on the top'

It was generally believed until a few years back that pruning was injurious to the fig, but experience shows this opinion to be unfounded, and that it is as tractable in this respect as any other tree

The object to be always kept in view is to have constantly a supply of fruit bearing shoots, and for this purpose the old wood should be gradually cut away, and the young introduced to fill the space thus created Since the climate of this country will not admit of two crops in one year being brought to maturity as in other countries more favourable to its growth, the fruit formed after Midsummer should be removed, in order to strengthen the tree and render it more productive the following season

Several modes of training are practised and recommended some gardeners recommend the fan system, others the horizontal, but this must depend entirely upon the growth of the tree if it be luxuriant the latter may be practised, if not the former will answer better as the more perpendicular a tree is trained the stronger it grows, and a contrary effect is produced by horizontal training Mr Knight recommends the branches to be trained in a downward direction as well as horizontally, and says, 'The young wood ceases to elongate very early in the season and thence acquires perfect maturity, and by being trained close to the wall it is not so liable to be injured by frost'

In many parts of the continent where the winter is very cold, but where the summer heat is sufficient to ripen the fig as a standard the trees are planted in rows and bent down near the ground in winter and then covered with leaves, which protect them from very severe frosts Wall trees are unnailed and bent down on each side to within a few feet of the ground, and then protected in the same way as standards

In this country the common practice is to stick yews, spruce-fir branches, or fern leaves amongst the branches of the fig upon the wall Where anything can be used for protection which can conveniently be removed in fine mild weather, it will be found of greater utility than having the branches covered up from the commencement of winter until the end of spring

When the trees are planted in the border of a hot house for the purpose of being forced, they are commonly trained to trellises, and the treatment is precisely the same as that recommended for open walls. After the fruiting season the border must be kept perfectly dry, in order that the trees may enjoy a season of rest, but a plentiful supply of water is given when they are in a state of growth

Those who have not a house which can be appropriated entirely to the forcing of figs may nevertheless obtain good crops by planting the trees in pots and forcing them in a cherry-house, peach house, or vinery

The time for beginning to force is from December to February, according as the fruit is wanted; and the tem-

perature should be gradually increased from 60° to 65° or 70° Fahr. Some also approve of a bottom heat, and recommend the pots to be plunged in a bed of leaves or tan.

The fig-tree is very apt to throw off its fruit before it ripens, and various methods have been suggested to prevent this. In the Levant, to insure a crop, a process termed caprification is resorted to, which consists in placing among the cultivated figs branches of the wild fig, in which a kind of Cynips abounds. This insect, issuing from the wild fruit, enters the others, brushing about the pollen in the inside, and so fertilising the fruit. Or those figs that drop prematurely and are chiefly filled with male flowers are preserved and introduced among the green growing figs with a view to their pollen being carried by insects to the flowers where they are wanted. Nothing is done in this country except ringing the shoots sometimes, and this is said to be attended with beneficial consequences. (See *Hort. Trans.*, vol. i., new ser., p. 395.)

FIGEAC. [LOT.]

FIGUERAS. [CATALONIA, p. 362.]

FI'GULUS. [CREEPER, vol. viii., p. 148.]

FIGURATE NUMBERS. [NUMBERS, FIGURATE and POLYGONAL.]

FIGURE (Geometry), a finite space, which has a boundary in every direction. The figure of a space is the notion we receive from observing its boundary.

FIGURE OF THE EARTH. [GEODESY.]

FIGURED BASE, in music, is a line, or staff, written in the base clef, over the notes of which are placed figures representing certain chords. This is commonly called the *Thorough-Base*. [THOROUGH-BASE.]

The *Figured Base* is fallen into disuse; though we are strongly of opinion that it might still be most beneficially employed in Scores. But in a piano-forte or organ part, when the harmony, or accompaniment is given fully in the treble staff, figures are not only superfluous, but perplexing and incorrect.

FILAMENT. [ANTHER.]

FILANGIE'RI, GAETA'NO, was born at Naples in 1752, of a noble family. In his early youth he did not exhibit any signs of extraordinary talent, but after being put under the care of Monsignor de Luca, bishop of Trivento, he made rapid progress in the classical languages, mathematics, and philosophy. In 1774 a reform in the judicial administration was determined on by the ministers of King Ferdinand, by which the judges of the various courts were in future to explain the grounds of their decisions by referring to some existing law applicable to each respective case, and in default of such a law, to ask the king for his decision. This determination, which checked the till then absolute discretion of the courts, was strongly opposed by the judges, supported by most of the law practitioners, as offensive to the dignity and independence of the courts, and they published a violent memorial on the occasion. Filangieri took up the matter, and wrote a reply showing the absurdity and impertinence of the objections as insulting alike to the liberty of the citizens and to the authority of the crown: *Riflessioni politiche sulla Legge Sovrana del 23 di Settembre del* 1774. The work was favourably noticed by the government, which enforced its decree regardless of the clamours of the interested party. Those were times of useful reforms and enlightened administration at Naples, when Genovesi, de Iorio, Galanti, Palmieri, Galiani, and other learned men were encouraged in suggesting improvements, which were at least in part acted upon. [FERDINAND IV. OF NAPLES.] In 1780, Filangieri, then 28 years of age, published the first volume of his great work, 'Scienza della Legislazione,' which made him known throughout Europe; he went on publishing the successive volumes in the following years. In 1787 he was appointed a member of the Supreme Council or Board of Finances, a department which stood also in need of reforms. He died in July, 1788, 36 years of age, regretted by all Naples, and leaving his work on legislation incomplete. The work however has gone through many editions, and has been translated into several languages; one of the best editions of the Italian text is that of the 'Classici Italiani,' 6 vols. 8vo. Milan, 1822, to which are added his 'Opuscoli Scelti' or minor works. Among the translations the French one, Paris, 1822, contains a biography of Filangieri by his countryman, Salfi. Benjamin Constant wrote a 'Commentaire sur l'Ouvrage de Filangieri,' 2 vols. 8vo. Paris, 1822—24.

Filangieri has been styled the Montesquieu of Italy, but there are considerable discrepancies between these two writers. Montesquieu, a man of maturer years, more extensive reading, and stronger reflective powers, was rather the historian of the laws and social institutions such as they existed then or had existed before his time, and although he discovered and pointed out abuses, yet he seldom advised change. Filangieri on the contrary recommends a complete reform in the laws, and lays down the bases of a new order of things. Both occasionally fall into apparent contradictions. Montesquieu, vehement and strong-minded, inveighs at times most strenuously, and in spite of his veneration for privileges and inequalities of rank, against the abuses of those very institutions; whilst Filangieri, a professed innovator, is led by his natural mildness of character and out of deference to existing forms of society, to make concessions which seem opposed to his principles. Thus he awards as a punishment for high-treason not only the penalty of death but also that of confiscation of property, and this at the very time that the penal code published by Leopold in Tuscany proclaimed to the world that 'confiscation was a real act of violence and a usurpation of private property by the government.' Filangieri aimed at effecting a change in legislation without a corresponding change in the forms of the government, and in his time, and especially in Italy, where numerous and important reforms emanated from the sovereigns themselves, this course appeared both reasonable and prudent. He says, in the introduction to his work, that 'his only object was to facilitate to the sovereigns of his age the task of a new legislation,' and his strong recommendation to them is to abolish all pernicious or useless laws, and to be sparing in making new ones without a real necessity. Like his contemporary Beccaria, he adopted the theory then prevailing in France, of an original social contract, by which every individual had resigned for himself and his descendants his right of self-defence which he possessed in a state of nature to the collective body of society, giving it thereby the right of punishing any one who made attempts against the security of another (*Scienza della Legislazione*, 11, 26). This fiction has been since overthrown by other writers, and in Italy especially by Romagnosi in his *Genesi del diritto Penale*, 1791, and in his *Assunto primo della Scienza del Diritto Naturale*, 1820. See also on this subject another Italian, Professor Rossi in his *Traité du droit Pénal*, Paris, 1835.

On some questions of political economy, on population, agriculture, &c., Filangieri shared the opinions prevalent in his time, which have been since exploded or modified by modern economists. Notwithstanding these and other blemishes, the work of Filangieri has still great merit; it suggests many useful ideas, and is throughout inspired by a sincere love for mankind, and an honest sincerity of purpose. The commentary of Benjamin Constant forms a very useful supplement to it.

FILA'RIA. [ENTOZOA.]

FILBERT, the fruit of a variety of the hazel-nut, or Corylus Avellana. [CORYLUS.] The term was originally applied to those kinds of nuts which have very long husks, but owing to the number of varieties that have of late years been obtained, this distinction, which was never scientific, appears to be nearly disregarded, and nut and filbert are almost synonymous terms, excepting that the wild uncultivated fruit, and those varieties which most nearly approach it, are never called filberts.

The best sorts are the following:—

- Frizzled filbert, excellent bearer.
- Red filbert, } bad bearers.
- White filbert, }
- Cob-nut (Pearson's Prolific, *Hort. Soc. Cat.*), a very prolific kind.
- Bond-nut.
- Cosford.
- Large square Downton.
- Northamptonshire, prolific.

According to the most skilful cultivators, the soil on which the filbert succeeds best should consist of 'a hazel loam of some depth, upon a dry subsoil;' but as this is not always found convenient, it should be remarked that it is not essential to the growth of the filbert, and some even recommend a dry poorish soil. The ground should be frequently dressed (at least once in two years), and a small quantity of manure given; woollen-rags are often used for this purpose with the greatest success, but manure of any kind will be found beneficial.

Filberts are most successfully propagated by layers or suckers. The layering should be performed in the earlier part of the season, in order that the plants may be well rooted, and ready to plant either in a nursery, or where they are intended to remain, in the autumn. When they are raised from suckers, these are generally taken from the parent plant in the end of the season, and subjected to the same treatment as layers. If it be desirable that the trees should be dwarf, layering and grafting are recommended; but if strong plants are wanted, they are raised from suckers: it is also said they fruit sooner by the last method.

The method of pruning depends in a great measure upon the object the cultivator has in view: if dwarf trees are wanted, the layer or sucker is shortened to about one foot and a half or two feet; if what are termed riders be desirable, then the stem is cut much higher; but if the shoot is weak it is better to cut it near the ground, and leave it the proper height at the next year's pruning. Afterwards, when any sucker makes its appearance at the bottom of the stem, it should be carefully removed, and not allowed to draw the nourishment from the parent plant.

In the formation of the head, the chief thing to be observed is to form it regularly, cutting away all strong superfluous shoots, keeping it thin and open in the centre, and thus allowing the free passage of light and air. 'There will be produced from the two and three years' branches, annually, short twigs of six or nine inches in length, which generally bear a great many nuts the following year; these should be thinned out, but not shortened, leaving them in tolerable quantity wherever they are produced, cutting them clean out the following winter, and leaving others in the same manner as those had been left the previous season.' (Lindley's *Guide*, &c.)

About Maidstone, and other parts of Kent, the management of the filbert is better understood than in any other part of this country; and as the soil and other circumstances seem to suit its growth, immense quantities are grown for the London market. 'That part of Kent where the filbert is chiefly cultivated is a loam upon a dry sandy rock. The Rev. W. Williamson advises every one to plant them where they are to remain, whether they are intended for a garden or a larger plantation; and after being suffered to grow without restraint for three or four years, to cut them down within a few inches of the ground. From the remaining part, if the trees are well rooted in the soil, five or six strong shoots will be produced. In the second year after cutting down, these shoots are shortened; generally one-third is taken off, and that they may appear regular, a small hoop is placed within the branches, to which the shoots are fastened at equal distances; by this practice, two considerable advantages are gained, the trees grow more regular, and the middle of each is kept hollow so as to admit the influence of the sun and air: but this in a large plantation would be almost impossible, nor indeed is it necessary, though in private gardens, where regularity and neatness are almost essential, it ought to be practised. In the third year a shoot will spring from each bud; these are suffered to grow till the following autumn, or fourth year, when they are cut off nearly close to the original stem, and the leading shoot of the last year shortened two-thirds. In the fifth year several small shoots will arise from the base of the side-branches which were cut off the preceding year; these are produced from small buds, and would not have been emitted had not the branches on which they are situated been shortened, the whole nourishment being carried to the upper part of the branch.

'It is from these shoots that fruit is to be expected. These productive shoots will in a few years become very numerous, and many of them must be taken off, particularly the strongest, in order to encourage the production of the smaller ones; for those of the former year become so exhausted, that they generally decay; but whether decayed or not, they are always cut out by the pruner, and a fresh supply must therefore be provided to produce the fruit in the succeeding year. The leading shoot is every year shortened two-thirds, or more, should the tree be weak; and the whole height of the branches is not allowed to exceed six feet. Every shoot that is left to produce fruit should also be tipped, which prevents the tree being exhausted by making wood at the end of the branch. It frequently happens that a strong shoot springs from the root; and should any of the first year's or leading branches be decayed, or become unproductive of bearing wood, it will be advisable to cut that entirely away, and suffer the new shoot to supply its place, which afterwards is to be treated in the same way as is recommended for the others.' (*Hort. Trans.* vol. iv.)

Such, according to Mr. Williamson, is the method of cultivating the filbert in the far-famed grounds of Kent, by which thirty hundred-weight per acre has been grown on particular lands: at the same time he acknowledges that failures are by no means unfrequent, but he attributes this to the excessive productiveness of successful years.

The filbert is a monœcious plant, having its male organs in one flower and its female in another; and one modern writer, suspecting a want of male blossoms to be the cause of failure in particular seasons, suspended a quantity of the catkins of the common hazel over the female blossems of some of his filberts, the result of which was a greater quantity of fruit than his trees had borne for many years. He then tried some *with*, and others *without*, the male flowers, when the former bore fruit, and the latter proved abortive, as he had anticipated. He therefore recommends unpruned hazels to be planted among the cultivated filberts, in order that impregnation may be effected.

Great quantities of filberts are rendered useless by being attacked by the *nut-weevil* (*Balaninus nucum*), which perforates the nut in its young state, and deposits its egg: in a few days the maggot is hatched, and then feeds upon the kernel. Some recommend the trees to be shaken in June or July, as this is the time when the insect makes its appearance, but no remedy is known which can be said to be effectual.

In order to preserve filberts in a fresh and plump state, it is only necessary to prevent their parting with their moisture by evaporation. Burying them in heaps in the earth, putting them in earthen jars in a wine-cellar, covering them with dry sand, are all very good plans, and many others equally efficient will suggest themselves.

FILICES. [GLEICHENIACEÆ.]

FILLET, a flat rectangular moulding, of very frequent occurrence in architecture. It is used to terminate or divide other mouldings, as in the cavetto, which is surmounted with a fillet, and in the flutings of columns, which are divided by a fillet. The fillet is much used in entablatures. [COLUMN.]

FILTER, a strainer used in chemical operations for the purpose of rendering fluids transparent by separating the suspended impurities which make them turbid, or for the still more important use of separating, collecting, and washing the precipitates or insoluble compounds resulting from chemical research and analysis.

Filters are usually made of unsized or blotting paper: and they are used either spread out upon cloth stretched on a wooden-frame, for larger operations, or folded and placed in funnels, and having consequently the form of an inverted cone.

Filters are either single or double: the former are usually sufficient for rendering fluids clear, but when the insoluble matter is to be preserved, double filters of equal weight are used; in this case, as it is always difficult and often impossible to remove the whole of the solid matter from the inner filter, the outer one, having been subjected to the action of the same fluid serves as a counterpoise to determine the weight of matter remaining on the inner filter when both have been dried.

In other cases a single weighed filter is used, and then the contained inseparable matter being heated to redness in the air with the filter in a crucible, so as to dissipate the carbonaceous matter of the paper, the quantity of earthy impurity remaining with the product is determined by burning an equal weight of similar paper. For the numerous precautions to be observed in filtration see Faraday's *Chemical Manipulation* and Berzelius's *Traité de Chimie*.

Within a few years various filters have been very usefully employed for the purpose of filtering water either for drinking or culinary purposes. These filters, though varying somewhat in construction, generally depend upon passing water through sand or small pebbles and charcoal. It is well known that the Thames water, though it contains but little saline matter in solution, is frequently turbid, owing to mechanical admixture of earthy matter, which the filters in question are well calculated to remove, so as to render the water, though not so agreeable as spring-water for drinking on account of its flatness, yet well adapted for other purposes, especially making tea and other similar uses.

FIMBRIA (Zoology). [VENERIDÆ.]

FIN. [FISH.]

FINA'LE (Ital. *Fi-nâ-le*), the concerted pieces of musi by which the acts of an opera conclude: the last movement of a symphony, concerto, &c. The winding-up of the first act of a grand two-act opera is, *par excellence*, called *the* Finale.

FINCH. [BULLFINCH; CHAFFINCH; FRINGILLIDÆ.]

FINCH. [NOTTINGHAM, LORD.]

FINE OF LANDS, one of the modes of conveying lands and hereditaments by matter of record. It was so called because it put an end not only to the actual suit of which it was the conclusion, but also to all other suits and controversies concerning the same matter. Divested of its technicalities, a fine may be described to be an amicable composition or agreement of a suit, either actual or fictitious, by leave of the king or his justices, whereby the lands in question become, or are acknowledged to be, the right of one of the parties.

This mode of conveyance, which was in use from the earliest periods of English history of which we possess any authentic judicial records, has been recently abolished by the stat. 3 and 4 Wm. IV., c. 74; yet the rules by which it was governed form a very considerable branch of real property law, and it is therefore desirable briefly to describe its nature and effect. Fines were of four kinds,—1. A fine 'sur conusance de droit, come ceo qu'il ad de son done,' *i. e.* upon acknowledgment of the right of the cognizee, as that which he (one of the parties to the fine) had of the gift of the cognizor (the other party to the fine). This was the best and surest kind of fine, for thereby the cognizor (the person in possession, also called the deforciant from keeping the cognizee out of possession,) in order to make good his covenant with the cognizee (the plaintiff), of conveying to him the lands in question, and at the same time to avoid the formality of an actual feoffment and livery, acknowledged in court a former feoffment, or gift in possession, to have been made by him to the plaintiff. This fine is therefore said to have been a feoffment of record, the livery thus acknowledged in court being equivalent to an actual livery; so that this conveyance was rather a confession of a former conveyance than a conveyance then originally made. 2. A fine 'sur conusance de droit tantum,' or upon the acknowledgment of the right merely; and not with the circumstance of a preceding gift from the cognizor. This was commonly used to pass a reversionary interest, for of such there could be no feoffment with livery supposed, as the possession during the preceding, or as it is technically called, particular estate belonged to a third person. [FEOFFMENT.] This kind of fine was worded in this manner, 'that the cognizor acknowledges the right to be in the cognizee, and grants for himself and his heirs that the reversion after the particular estate determines shall go to the cognizee.' 3. A fine 'sur concessit'—which was where the cognizor, in order to make an end of disputes, though he acknowledged no precedent right, yet granted to the cognizee an estate usually for life, or for years, by way of supposed composition. And this might be done reserving a rent or the like, for it operated as a new grant. 4. A fine 'sur done, grant, et render,' which was a double fine, comprehended the fine 'sur conusance de droit come ceo,' &c., and the fine 'sur concessit.' This might be used to create particular limitations of estate, whereas the fine 'sur conusance de droit come ceo,' &c., conveyed nothing but an absolute estate of inheritance or at least of freehold. In this last species of fine, the cognizee, after the right was acknowledged to be in him, granted back again, or rendered to the cognizor, or perhaps to a stranger, some other estate in the premises. But in general, the first species of fine, 'sur conusance de droit come ceo,' &c., was the most used, as it conveyed a clear and absolute freehold, and gave the cognizee a seisin in law, without any actual livery, and it was therefore called a fine executed, whereas the others were but executory.

Fines of all four kinds were thus levied, to use the technical term,—First, the party to whom the land was to be conveyed commenced an action or suit at law against the party who was to convey, by suing out a writ or *præcipe*, called a writ of covenant. The action was founded upon the breach of a supposed agreement or covenant, that the one should convey the lands to the other. On this writ a fine, called a *primer fine*, amounting to about one-tenth of the annual value of the land, became due to the king. The suit being thus commenced, then followed,—Secondly, the 'licentia concordandi,' or leave to compromise the suit, upon which also another fine, called the king's silver, or sometimes the post fine, became due to the king, amounting to about three-twentieths of the annual value of the land. Thirdly, came the concord or agreement itself, which was required to be made either openly in the Court of Common Pleas or before the lord-chief-justice, or one of the judges of that court, or two or more commissioners in the county specially authorized; all of whom were bound by stat. 18 Ed. I., s. 4, to take care that the cognizors were of full age, sound memory, and out of prison. If a married woman was a cognizor she was privately examined by the parties before whom her acknowledgment was taken, whether she did it freely and willingly, or by compulsion of her husband. A fine was the only way in which a married woman could convey her freehold interest in lands.

By these several acts the essential parts of the fine were completed, and even if the cognizor died, still the fine might be carried on in all its remaining parts, of which the next was—Fourthly, the note of the fine, which was simply an abstract of the writ of covenant and the concord; naming the parties, the parcels of land, and the agreement, for the purpose of enrolment of record in the proper office. The Fifth and last part was the foot of the fine, which included the whole matter, reciting the parties, day, year, and place, and before whom it was acknowledged or levied. Of this indentures were made or engrossed at the chirographer's office, and delivered to the cognizor and the cognizee; usually beginning thus: 'hæc est finalis concordia;' 'this is the final agreement;' and then reciting the whole proceeding at length.

The note of the fine was read four times openly in the Court of Common Pleas, or as it was called, proclaimed, once in the term in which it was made, and once in each of the three succeeding terms, during which all pleas ceased, and these proclamations were endorsed upon the record. A table of the fines levied in each county in every term was affixed in some open part of the Court of Common Pleas all the next term, and a copy of the same was given to the sheriff of every county, who at the next assizes fixed the same in some open place in the court, for the more public notoriety of the fine. (2 Bl. *Com.* 349.)

Of the effect of a Fine.—A fine was a conveyance so effective that it bound not only those who were parties and privies to the fine, but all other persons whatsoever, unless they brought their action or made lawful entry within five years after proclamation made, except married women, infants, prisoners, persons beyond the seas, and such as were not of whole mind, who had five years allowed to them and their heirs after the death of their husbands, their attaining full age, recovering their liberty, returning into England, or being restored to their right mind. Persons also who had not a present, but a future interest only, as those in reversion or remainder, had five years allowed them to claim in from the time their right accrued by the stat. 4 Henry VII. c. 24.

In order to make a fine of any avail at all, it was necessary that the parties should have some interest or estate of freehold in the lands to be affected by it. (2 Bl. *Com.* 355.) But it was not necessary that the freehold should be in either of the parties by right, and therefore when a fine was levied to strengthen a title, it was frequently considered necessary to make a feoffment, in order that the freehold might be in one of them by disseisin. [FEOFFMENT.) If neither of the parties had any interest at the time, although the fine had no proper operation, yet it might take effect as between them by way of estoppel. [ESTOPPEL.]

A fine was principally used as the mode of conveying the estates of married women, and renouncing their right to dower, as a means of barring estates tail, and remainders and reversions dependent upon other estates, and also for the purpose of strengthening defective titles.

By the 3rd and 4th Will. IV. c. 74, fines are abolished, and provision is made for the conveyance of the interests of married women in land, with the concurrence of their husbands, and after being examined to ascertain if they are acting voluntarily, by a deed to be acknowledged in the Court of Common Pleas; and provision is also made for the barring of estates tail by a deed enrolled: but no provision is made for enabling parties whose titles are defective to strengthen them by any means analogous to a fine and nonclaim. (2 Bl. *Com.*; Cruse *On Fines.*)

FINGAL. [OSSIAN.]

FINGER. [HAND.]

FINGER-BOARD, the whole range of keys, white and black, of a piano-forte or organ.

FINGERING, in music, is the art of so applying the fingers to a musical instrument, the piano-forte and organ especially, as to accomplish the objects in view in the easiest and most effective manner. In a work of this kind practical treatises would occupy too much room, and the art of Fingering, accompanied by the necessary examples, would require many pages; we therefore shall only add that, as a system, Clementi's is the best that we are acquainted with; though some few modern improvements have been made in its details.

FINISTE'RE, a department at the western extremity of France, comprehending a part of the former duchy of Bretagne. It is of an irregular form, nearly resembling the Welsh county of Pembroke; the inlets of Brest Water, and the Bay of Douarnenez, occupying the same relative position in one that St. Bride's Bay does in the other. It is washed on the northern, western, and southern sides, by the Atlantic ocean; and bounded on the eastern side by the departments of Côtes du Nord and Morbihan. The greatest length is from the north-west coast, between the villages of Argenton and Kersaint, to the mouth of the river Quimperlé, 78 miles; the greatest breadth at right angles to the length is from the Bec du Raz to the mouth of the Douron, 68 miles. The area of the department is about 2676 square miles, being about an eighth larger than the average of the French departments, and rather larger than the English county of Lincoln. The population in 1832 was 524,396, about 196 to a square mile, being the average relative population of France in the proportion of nearly 5 to 4, and to that of the English county with which we have compared it in the proportion of nearly 5 to 3.

The coast, which is commonly high, presents a very broken outline, and on almost every side of it are innumerable islands and rocks. On the north side are the Ile de Bas, the Iles de Meloine, Los Calorос, and others; on the south side the Iles de Glenan, Les Pourceaux, the Ile aux Moutons, and others; and on the west a group of greater importance than any of the foregoing, comprehending the Ile d'Ouessant (or, as it is frequently called by English writers, Ushant), Balanee, Molene, Quemènés, and several others: this group is separated by the Passage du Four from the headland on the northern side of Brest Water. The Ile de Sein is also on the western coast of the department, and is separated by the Passage du Raz from the Bec du Raz on the southern side of the bay of Douarnenez. There are some others, very small.

The Ile de Bas has been noticed already. [BAS, ILE DE.] Ouessant has a very steep coast, difficult of access: it is about four miles long from east to west by three wide. There are on it a castle, a lighthouse, two churches, and four small chapels, and several hamlets or groups of houses. The soil is fertile: the inhabitants, who amount to about 1800, feed sheep and rear horses, the breed of which, though small, is hardy. This island formerly constituted a marquisate. A magistrate (juge de paix) resides in the village or hamlet of St. Michel. A drawn battle was fought off Ouessant in the year 1779 between the French fleet under the Count d'Orvilliers, and the English under the Admirals Keppel, Harland, and Palliser. Ouessant was known to the Romans by the names Uxantis or Axantos. The other islands do not require notice. The chief bays and inlets on the coast of the department are those of Brest, at the north-western extremity of which is the Pointe St. Mathieu; of Dinant; of Douarnenez, at the extremities of which are the Bec de Chèvre and the Bec du Raz; of Audierne, at the extremities of which are the Pointe de Begalan and the Pointe de Penmarch; of Benodet, at the extremities of which are the Pointe Enizan and Pointe Labert; and de Forest. The headlands, Pointe Treignon, Pointe de Bechou, Pointe Douelan, and Pointe Pouldu, are on the south coast of the department.

There are two principal ranges of hills in the department, which commence respectively at the headlands north of the water of Brest and south of the bay of Douarnenez, and run eastward into the department of Côtes du Nord, in which their ridges unite: the northern range is known as Les Monts d'Arrée, and the southern as Les Montagnes Noires (the Black Mountains): they inclose between them the basin of the Aulne, the most considerable river of the department. These mountains consist of granite of various kinds: the most common is coarse-grained, and is composed of mica, quartz, and felspar. The outline of the hills is picturesque, but their elevation is not great, they rarely exceed 900 feet. From the proximity of the mountains to the sea, the streams which rise on their slopes have a very short course. The following run into the sea on the northern coast, ranging from east to west:—the Douron, which in the lower part of its course forms the boundary between this department and that of Côtes du Nord; the Dourdu; the Releo, which receives the Jarlo; the Penze; the Fleche; and the Aber-Benoist, which receives the Leuban: on the west coast, ranging from north to south, are the Aber Ildul; the Elorn or Landernau, about 30 miles long, for seven or eight of which (viz., up to Landernau) it is navigable; and the Aulne or Châteaulin, of which below: on the south side, ranging from west to east, are the Odet, 33 miles long, navigable to Quimper, 10 or 12 miles above its outfal; the Beton; and the Ellé, about 33 miles long, which rises in the department of Morbihan, and receives the Isok or Isole from the junction of this stream the river assumes the designation of Quimperlé. The Aulne, the only one of these rivers that requires particular notice, rises on the southern slope of the Monts d'Arrée, near the boundary of the department, and flowing southward for 24 miles, receives the Hiere, nearly 30 miles long, from the adjacent department of Côtes du Nord: from the junction of the Hiere it winds westward past Châteauneuf du Faou to Châteaulin, 26 or 28 miles, and there becoming navigable, flows west-north-west about 12 miles into Brest Water; its whole course is from 62 to 64 miles. The Hiere is the only tributary of any considerable size which joins it on the left bank; on the right bank it receives the Elez, the Goanes, and the Doufine, all from the slopes of the Monts d'Arrée. There are many smaller streams, and a considerable number of small lakes or étangs.

The climate of the department of Finistère is cold and foggy: the quantity of rain which falls is very great. In some parts, on the coasts and on the hills, the winds, which blow chiefly from the west, the north-west, and the south-west, are very tempestuous, especially in winter; the frosts are also severe in many parts. In other places the climate, though always humid, is not so tempestuous or so cold. Thunder occurs chiefly in winter. The air is no otherwise unhealthy than by the changeableness of its temperature, the influence of which it requires a strong constitution to withstand, especially on the coast. Catarrhal affections are of frequent occurrence.

The soil is various: silex, alumine, and magnesia are its chief constituents. The adherence of the cultivators to old usages has been a barrier to the introduction of improvements in agriculture, and the value of the agricultural produce is considerably below the average of France. The quantity of wheat raised is not sufficient for the consumption of the department; rye, oats, buckwheat, flax and hemp are grown; and in some places abundance of pulse. Hay is plentiful and of good quality. Fruit is scarce; there are no vineyards. The quantity of woodland is small: there are some wastes which produce only heath and broom, which, in the scarcity of wood, are used for fuel. The cattle of the department are small, but grazing is carried on to a considerable extent: the horses are good; the sheep, which are not numerous, are of small size, and their wool is of ordinary quality. Many bees are kept; game is plentiful, and some wolves are found. The streams and pools abound in fish, as also the coasts, on which the fishery, especially of the sardine, or pilchard, is very actively pursued.

The mineral treasures of the department are of great value; mines of lead, in combination with which silver is found, and mines of iron, are wrought. There are coal-pits, quarries of common granite, fine black granite, sandstone, and slates. Cold mineral springs are of tolerably frequent occurrence, and some of them are of considerable efficacy, though they have not attained any great reputation.

The chief manufactures are linens of various sorts, pottery, paper, rope, leather, and some chemical productions. The trade carried on is considerable; the productions and manufactures of the department furnish the chief articles of exportation; the chief imports are wines, brandy, oil, and soap. The length of the coast-line, the number of the harbours, and the navigation of the rivers Elorn, Aulne,

and Odet, are favourable to commerce. A canal from Nantes to Brest is in progress, if it is not completed; it enters the department on the east side, and follows the valley of the Aulne, which river it joins at or near Châteaulin. The high road from Paris to Brest enters the department on the north-east side, and runs through Morlaix, Landivisiau, and Landernau: this is the only road of the first class. A road of the third class enters the department on the east side near Carhaix, from which town it sends off three branches, one northward to Morlaix and St. Pol de Léon, one north-westward to Landernau and Lesneven, and one south-east into the department of Morbihan; another road of the same class enters the department on the east side near Quimperlé, and runs through that town, Rosporden, and Quimper, to Douarnenez, Pont Croix, and Audierne; another of the same class runs from Quimper by Châteaulin and Le Faou to Landernau. The other roads are bye-roads.

The department is divided into five arrondissements, viz., those of Morlaix, in the north-east, population in 1832 131,580; of Brest, in the north-west, population 156,810; of Châteaulin, in the centre, population 94,302; of Quimper, in the south-west, population 100,676; of Quimperlé, in the south-east, population 41,028. These arrondissements are subdivided into 43 cantons, or districts, each under a justice of the peace, and again into 290 (or, according to others, 284) communes, which, in extent and population, may be compared with our parishes. In this department, as in the other parts of the antient Bretagne, the rural population considerably surpasses that of the towns. The chief towns are Quimper, the capital, on the Odet, population 9860; Morlaix, at the junction of the Relec, and the Jarlo, population 7797 for the town, or 9596 for the whole commune; and Brest, population 29,860. [BREST; MORLAIX; QUIMPER.]

Of smaller towns, there are in the arrondissement of Morlaix, Lanmeur, on a bye-road from Lannion (Côtes du Nord) to Morlaix; Guerlesquin, on the border of the department east by south of Morlaix; Landivisiau, on the road from Morlaix to Brest, and St. Pol de Léon (population 3106 for the town, or 6692 for the commune); Plouescat, (population of the commune 3017), and Roscoff (population of the commune 3332), all on the coast. St. Pol de Léon was from the sixth century to the time of the Revolution the capital of a diocese, the bishop of which was a suffragan of the archbishop of Tours. The town is built on the slope of a hill: the chief buildings are the town-hall; the cathedral, which is built of granite, and presents little that is worthy of notice except some handsome stained glass windows; and a lofty tower more than 180 feet high, called the tower of Creisker. There were several religious houses and a college before the Revolution. The town has a small harbour: the inhabitants manufacture some cotton and linen, and trade in paper, leather, pottery, wax, honey, and horses, which last are in high repute. Turf is dug and stone quarried in the neighbourhood. Roscoff has a small port and an excellent roadsted, in which the vessels that navigate the Channel frequently anchor. Mary Queen of Scots, when she was brought to France to marry Francis II., landed at Roscoff, and caused a chapel, dedicated to St. Ninian (called in Breton St. Draignau) to be erected on the spot where she disembarked. Before the Revolutionary war the inhabitants carried on a considerable trade (probably contraband) with England in wine, brandy, and tea, and exported a considerable quantity of linen to Spain; this branch of trade has since passed to Morlaix. At Landivisiau are upwards of sixty tan-yards: trade is carried on in linen, corn, honey, candles, and butter.

In the arrondissement of Brest are Gouesnou or Goueznou and St. Renan, near Brest; Landernau or Landerneau (population 3905 for the town, or 4933 for the whole commune), on the river Elorn or Elhorn; Ploudiry near Landernau; Lesneven (population 2050 for the town or 2404 for the whole commune), on a road from Landernau to the coast; and Lannilis (population of commune 3179) and Ploudalmezeau (population of commune 3023), both on the coast. Landernau is in the Breton language called Landternock. In the contest for the duchy of Bretagne between the houses of Montford and Penthièvre [BRETAGNE], Jean IV. (of the house of Montfort) took Landernau and put the garrison to the sword. The chief buildings of the town are the town-hall and two hospitals, one of them a marine hospital. There are a great number of tan-yards: trade is carried on in the agricultural produce of the surrounding district, grain, pulse, flax, hemp, honey, wax, cattle, and horses, and in soap, tallow, leather, and soda. The navigation of the river commences here, and the high road from Paris to Brest passes through the town. Lesneven has a marine hospital, a large unadorned building capable of receiving 500 patients. There is a large corn market held here.

In the arrondissement of Châteaulin are Châteaulin, the chief town, and Châteauneuf du Faou, both on the Aulne; Huelgöet and Pleyben (population of commune 4508), near the same river but not on it; Bruspars, on the Doufine; Carhaix (population of town 1796, of commune 1939,) on the Hiere; Loc Renan near the bay of Douarnenez and Le Faou or Faon on Brest Water. Châteaulin is a small place in a pleasant situation; it is divided into parts by the Aulne, over which there is a bridge: the navigation of the river begins here. The principal trade of the inhabitants is in slates, some of which are exported to foreign parts, and in salmon, of which a vast quantity is caught and sent into the neighbouring departments and even to Paris. There are two ebbing and flowing wells in the neighbourhood of this town. Carhaix appears to have existed in the Roman times, and to have been the Vorganium of Ptolemy and the Vorgium of the Theodosian table, the chief town of the Osismii: it is supposed to have been ruined by the Normans in the ninth century. It was the birth-place of Theophile Malo La Tour d'Auvergne, a descendant of Turenne, a warrior and an antiquarian of considerable celebrity. He fell in the battle of Neubourg, A.D. 1799. Huelgöet has a lead mine which furnishes employment to 280 workmen, and produces yearly 370,000 kilogrammes of lead ore and 300 kilogrammes of silver. The kilogramme is equal to rather more than 2lbs. avoirdupois. At the village of Poullaouen (population of commune 3544) is a yet more valuable mine, the most considerable in France, and one of the best in Europe: it yields annually 660,000 kilogrammes of lead ore, and 400 kilogrammes of silver. The machinery employed in working the mine and the buildings for smelting the ore are worthy of notice. Poullaouen is between Huelgöet and Carhaix.

In the arrondissement of Quimper are Douarnenez on the bay of that name; Audierne on the bay of Audierne, and Pont Croix near it; Pont L'Abbé, (population of town 1960, of commune 2785,) near the bay of Benodet; Concarneau in an island on the bay of Forest; and Rosporden on the road from Quimper to Quimperlé. Douarnenez with a population of 2000, chiefly sea-faring people, and Audierne, are fishing towns; the fish taken are the conger and the whiting: Audierne has a large and safe harbour, but the neighbouring coasts are an object of dread to mariners from the frequency of shipwrecks; Pont L'Abbé is in the midst of one of the most productive corn districts of the department: the butter of the neighbourhood is much esteemed. Concarneau was formerly a place of great strength: it is still defended by walls and by a castle built by Anne, heiress of Bretagne and Queen of France. The port does not afford good anchorage: The inhabitants are engaged in the sardine or pilchard fishery, in which 400 vessels are employed.

In the arrondissement of Quimperlé are Quimperlé on the Ellé or Quimperlé (population of town 3866, of commune 5275); Pont Aven, on a small river which unites with the Beton; and Bannalec (population of commune 4183), on the road from Quimper to Quimperlé. Quimperlé or its neighbourhood was not unfrequently the residence of the dukes of Bretagne, who had here a castle called Carnoet. In the civil dissensions of Bretagne and afterwards in those of France Quimperlé was the object of attack. The town is handsome: it has two good streets and a fine church; the sub-prefect's offices, formerly a benedictine convent, is worthy of notice. The trade of the town is promoted by the navigation of the river Quimperlé, formed by the junction of the Ellé and the Isole or Isok: vessels of 50 tons can get up to the quays. There are several tan-yards and a paper-mill; and trade is carried on in corn, cattle, and shoes or sabots. There are a high-school and a society of agriculture. The name of the town was originally Avantot, then Quimper, then from the name of the stream, the Ellé, on which it stands (Quimper Ellé), Quimperlé. The inhabitants of Pont Aven are engaged in the salmon fishery; the stream on which the place stands abounds with excellent salmon.

The department forms the diocese of Quimper, the bishop

of which is a suffragan of the Archbishop of Tours. It is in the jurisdiction of the Cour Royale or High Court of Justice of Rennes, and in the circuit of the Académie Universitaire or Educational Board of that city. It is comprehended in the 13th military division, the head-quarters of which are at Rennes. It sends six members to the Chamber of Deputies.

In respect of education this department is one of the most backward in France: the number of boys at school is to the whole population only as 1 to 199.

FINITE (in Mathematics), having a boundary, used as opposed to INFINITE.

FINLAND, the principality of, forms a Russian government composed of Finland, the two Lapmarks of Kemi and Tornea, and the province of Wiborg. It lies between 59° and 70° N. lat. and 28° and 31° E. long. On the north its boundary is Norway; on the north-east, the government of Archangel; the east, Olonetz; the south-east, St. Petersburg; the south, the gulf of Finland; the south-west, the Baltic; the west, the gulf of Bothnia; and the north-west, Sweden. Its present name was given to it by the Swedes; but the natives call it *Suomemna*, the region of lakes or swamps. Its area is variously estimated, and some have even carried it as high as 134,400 square miles; but Oldekop's estimate of 111,300 is probably nearest the truth. The number of inhabitants, which was 1,093,957 in 1815, and 1,177,546 in 1825, is at present computed by Arsenief to be 1,500,000. The Lapmarks of Kemi and Tornea, which constitute *Russian Lapland*, occupy the whole northern districts of the principality of Finland. The Lapmarks, which lie almost entirely within the polar circle, are so sterile as not to contain a population of more than 8000 individuals on an area of 31,500 square miles; frequently not a single dwelling is met with for 80 or 100 miles together.

The surface of Finland, in the eastern and central parts, is intersected by lakes, rivers, and swamps, between which there are flats of sand overgrown with moss and studded with low hills. In the northern and western parts it is covered with mountains belonging to the great Scandinavian chain, which are called the Russo-Lapland range. In the northern there is no height greater than the Poldoivi, on the borders of Norway, which is said to have an elevation of 2000 feet. The most extensive group of the range is in the southern part of Russian Lapland, whence it sends out its branches in all directions; the main range running parallel with the eastern coast of the gulf of Bothnia, until it gradually subsides, and at last disappears to the north of Biörneborg. The loftiest summits in this range are Narangavaara and Livaara, from which the sun may be seen during the whole twenty-four hours at Midsummer. It is said, however, that the highest point is not more than 3500 feet above the surface of the sea. In the more southern latitudes of the principality the valleys between these mountains contain good arable and rich meadow land. The coasts both of the gulf of Bothnia and Finland are lined with precipices, reefs, and rocky islands, which render navigation very hazardous, especially in the south-west. The centre of Finland is an elevated plateau, from 400 to 600 feet above the sea, full of lakes, and covered with low rocky elevations, mostly composed of red granite. The Kaselka, or main chain of mountains, which terminates above Biörneborg (61° 27′ N. lat., 27° 40′ E. long.), chiefly consists of primitive rocks. In some parts of the low lands the surface is overspread with enormous blocks of granite. Many of the lakes in the interior of Finland have their outlet in the gulfs of Bothnia or Finland. Independently of Lake Ladoga [LADOGA], which occupies a considerable portion of the south-eastern part of Finland, the largest of these waters is Lake Saima, or Saima Vési, a little to the north of Wiborg, which is more than 300 feet above the level of the sea, nearly 180 miles in length and from 20 to 25 miles in breadth. It is full of islands, the basis of which is granite, and it flows through the Vouoxa or Voxa into Lake Ladoga. Next to this is Lake Enare, or the Enare-Träsk, the latter word signifying a lake, in the northernmost part of Lapland, which covers above 1000 square miles, and has its outlet into the Frozen Ocean by the Palsyoki.

There are no rivers of any considerable length. The largest are the Voxa, which originates in the collected waters of numerous smaller rivers and lakes, in the northern part of the district of Kuopio, flows southward into Lake Saima, and thence eastward into Lake Ladoga. It is so full of granite rocks and falls as to be of little use for navigation. The Kymmene is a broad stream, issuing from Lake Pemena to the west of Lake Saima, seldom less than 250 to 300 feet in width and varying from 50 to 150 in depth; it falls into the gulf of Finland near Kymmenegaard, but, owing to the frequent falls, is not navigable. The Kumoyoki flows from a lake still more to the west, and falls into the gulf of Bothnia near Biörneborg. The Yananus, an outlet of Lake Yänisyärwi, flows into Lake Ladoga. The Sestra is the boundary between the governments of Finland and St. Petersburg; the Tornea and Muonio separate Finland from Sweden, and the Tana-elf divides it from Norway. The line of the Tana-elf is first from south-west to north-east at Palmayawry, where it quits the Finland border and flows through Finmark in Norway north-by-east into the Tana-fiord.

The waters of Finland and its numberless swamps and moors occupy more than a third of its surface; but the climate is on the whole salubrious, and there are many cases of great longevity. The average duration of the summer, which is accompanied by great heat, is not more than three months; the winter, which lasts from seven to eight, is exceedingly severe, particularly in the north. During the latter season there is a direct road across the frozen gulf of Bothnia to Sweden. In the northern parts of Russian Lapland the sun disappears entirely from the end of November to the close of January; an interval which the people term 'skaabmo,' an abomination; but during which the moon and stars frequently shine with exceeding splendour throughout the twenty-four hours. The climate is less severe in the central and southern parts, but thick cold fogs are common.

There are extensive forests of firs and pines in the south, interspersed with oaks, elms, &c. both on the mainland and the islands: they are of peculiarly luxuriant growth on the soils which receive the exhalation from the lakes and swamps. In northern Lapland these trees are replaced by the birch, until, in the coldest districts, trees cease altogether. The mountains and hills are in general naked; but even where they are wooded, the wood is low and stunted.

The greater portion of the soil is either stony or sandy. Rich vegetable earth is of rare occurrence, and scarcely ever unmixed with sand. In order to manure his land, the agriculturist is in the habit of setting fire to his forest or underwood. By this means he is enabled to grow his rye or oats for two or three years in succession, after which he plants the ground afresh and lets it lie for twenty or thirty years, until the wood is sufficient for another burning. By this process, practicable in so thinly a peopled country only, the soil of Finland is rendered capable of producing grain adequate to its consumption in common years, and more than adequate in favourable seasons. There was a time, indeed, when it was called 'the granary of Sweden:' no further back than the year 1795, its export of grain amounted to 50,000 quarters. Nyland and the south-western districts of Finland raise the largest quantities; Wiborg does not, one year with another, produce sufficient for its own consumption. Barley and rye are chiefly cultivated; oats are often sown the year after the land has borne rye; a little wheat is raised; and grey peas and beans in Wiborg, S. Michael, and Tavustehus. The frost, however, sets in so soon and the weather is so uncertain, that it is common for the farmer to use the precaution of gathering in his crops while they are green, in the early part of August, and afterwards to dry them. Hemp and flax, hops, and a little tobacco are also cultivated. Potatoes, carrots, coleworts, parsnips, and onions are partially raised; but wild berries are the only fruit, except perhaps in the vicinity of Abo. The crab apple grows wild, but not beyond the sixtieth degree of latitude. The oak does not thrive beyond 61°, nor the ash beyond 62°. The forests have suffered greatly, particularly near the sea-coast, from wasteful use and firing; but large quantities of timber are still exported in the shape of deals, masts, &c.; and much pitch and potash, as well as fire-wood, are sent abroad. The pasture-lands are ill managed, and the breeding of cattle and horses is therefore very limited. In this respect the neighbourhood of Kemiträsk, in the circle of Uleaborg, however, which abounds in luxuriant meadows, forms an exception. Moss, in the bleaker regions, is the only food for domestic animals, for which the reindeer is an inestimable substitute. The horse of Finland is small, but strong,

and active. Fowl and other wild game are plentiful. Bears, elks, wolves, foxes, martens, &c. afford a large supply of furs and skins. Reindeers abound in all parts of northern Finland; the stock in the district of Kuusamo alone is 12,000 heads; and in that of Ursjocki, in northern Lapland, it is between 40,000 and 50,000. These animals constitute, in fact, the wealth of the Laplander; they supply him with food, clothing, and other necessaries, as well as the means of barter for his principal luxuries, brandy and tobacco; nor is he accounted affluent unless he be owner of 200 or 300 of them.

Fish is the chief food of the Laplander, whose streams, such as the Tornea and Tana, are well provided with salmon, pike, a kind of eels, red-eyes, &c. The pearl muscle is found in some of the lakes and rivulets of the western parts.

Finland has few mineral products. Bog iron is obtained in some parts, and converted to domestic use; lead is also found, and a little copper here and there, but neither in large quantity. Marble is quarried in the district of Ruskeala and the island of Arasati in lake Ladoga. Slate is plentiful, and chalk abounds in some places. The want of salt is severely felt, and the attempts made to extract it from salt water have not been attended with much success. The whole annual metallic produce of Finland does not exceed 12,000 poods, or about 420 tons.

The majority of the population is of Finnish extraction. The Fins call themselves 'Suomalans' or 'Suomes,' but they are denominated 'Tschudes' by the Russians: they are slow, grave, and self-willed, but peaceable, brave, and hospitable, temperate and industrious: their complexion is dark, their countenance and manner are serious, and they are well knit, and of a robust make. They are all free, and many of them are landholders. A great number have leases of the crown, and hold their farms for life, with the privilege in some cases of bequeathing them to their children. Their dwellings, called 'Poertte,' are low, dark, and unclean, and built of wood. The Laplander is of the same extraction as the Finlander, and calls himself a 'Sameladz or Samo;' he is indignant when styled a 'Lapp' ('lapor' in Russian), the name given to him by the Swedes, which signifies a coward, seer, magician, or poisoner. They resemble the Finlanders in all respects except that the upper jaw projects more, and their hair is of a deeper tint. There are not many thousands of them in this government; they lead a wandering life, and are divided into two classes, the reindeer Laplanders and the fishing Laplanders. Numbers of Russians and some Swedes have settled in the districts of Wiborg and Kexholm, as well as in the Finland towns.

According to the consistorial returns, the number of births in 1822 was 42,898, and in 1823 49168; the deaths in 1822 were 33,535, and in 1823 29.578; and the marriages in 1822 were 9809, and in 1828 10,764. In the five years' interval from 1815 to 1820 the excess of births over deaths was 81,589, which gives an annual increase of 16,317. Finland contains 26 towns, 1894 villages, and 28,735 'hemman,' hamlets, settlements, and homesteads. All the inhabitants, except the Russians, profess the Lutheran faith. Finland Proper is divided into two dioceses, Abo with 19 deaneries (probsteien) and Borgo with 7. The followers of the Greek ritual are under the archimandrite of St. Petersburg. The university of Abo has been transferred to Helsingfors since the year 1827. There are grammar schools in Wiborg, Abo, and Borgo, and inferior schools in the majority of the parishes; but public instruction is not widely extended, and the proportion of scholars to the general population was not more than 1 in 109 about four years ago.

Agriculture, the breeding of cattle, and in some parts the fisheries, constitute the principal occupations of the people. There are few manufactures except in the large towns, and these are principally of iron ware, sail-cloth, and stockings. The peasantry make what coarse woollen and linen they require under their own roofs; they also prepare tar, potash, and charcoal, make articles of wood for their own use and for exportation, and in some of the ports vessels are constructed. Navigation is much impeded by the severity of the winter, which shuts the harbours from six to seven months in the year. The trade of Finland amounts to about 250,000*l.* annually in imports and 280,000*l.* in exports; the latter consisting principally in the supply of St. Petersburg, by the channel of Lake Ladoga and the gulf of Finland, with timber, meat, butter, skins, tar, fish, &c. The same articles are likewise exported to Sweden. Salt is a great article of import.

There is a distinct establishment at St. Petersburg for the government of this vast province or principality. The governor-general, who resides at Helsingfors, has chiefly military duties to discharge. Though Finland has a constitution of its own, by which the inhabitants are classed in four orders, the diets are never convoked, except on the occasion of additional taxes being contemplated by the government. The senate in fact has been found a more convenient body to manage than the diets, and it has almost superseded them.

In the year 1831 the principality was re-moulded into eight circles or 'Loen,' at the head of each of which there is a superintendent called a 'Landshoefding;' each circle is divided into districts, or 'Foegderier,' and each of the latter into bailiwicks, or 'Hoerad.' In judicial matters the Swedish system has been retained; and this is the case also with regard to fiscal concerns. In the absence of official data, the revenue has been estimated at 60,000*l.* sterling per annum.

The eight circles, or loens, commencing from the south, are Wiborg, St. Michael, Nyland, Tavastehus, Abo-Biörneborg, Wasa, Kuopio, and Uleaborg-Kayana. The circle of Wiborg has the town of the same name for its capital, which was the antient capital of Carelia; it lies on a bay of the gulf of Finland, is well fortified, consists of the main town and two suburbs united by a wooden bridge to the island on which the castle stands, and has an elegant Greek cathedral, a church for the Swedes and Germans, and another for the Finlanders, a Roman Catholic chapel, a district school, besides other schools, and about 3000 inhabitants. In this circle is Frederikshamm, on a peninsula on the bay of Finland, a strong fortress, containing about 1400 inhabitants: it was here that the treaty of September, 1809, was concluded, by which Sweden made over Finland with part of Lapland and the Aland Islands to Russia. St. Michael, north-west of the preceding circle, contains St. Michael, a small town, and Nyslott, another small town with a strong castle. In Nyland, west of Wiborg, is Helsingfors, the capital of the principality, on a tongue of land in the gulf of Finland, with about 10,000 inhabitants, and the strong fortress of Sweaborg, at the entrance of the harbour. North of this place lies Borgo or Borgao, a small town on the river of the same name, with a cathedral, a church, gymnasium, manufactures of linen, sailcloth, refined sugar, and tobacco, and about 2500 inhabitants. Lowisa, formerly Degerby, north-east of Borgo, is a seaport, with two churches, and about 2800 inhabitants. The circle of Tavastehus, north of Nyland, has for its capital Tavastehus, lying on a lake, with a strong castle, a church, and about 1700 inhabitants. Abo-Biörneborg, the westernmost circle of Finland, includes the islands of Aland in the gulf of Bothnia; its capital is Abo, Obo, or Turku, on the south-western coast of Finland, with about 13,200 inhabitants. In this circle are also Biörneborg, near the mouth of the Kumoyoki, a maritime town of about 4600 inhabitants, well built, with a church, grammar school, and boat manufactures and trade: Raumo, a town with 1700 inhabitants; and Nystad, a sea-port of about 1680, where the treaty by which Sweden relinquished the Baltic provinces and part of Finland to Russia in August, 1721, was concluded. North of this circle is that of Wasa, on the gulf of Bothnia. Its capital is Wasa, on the gulf of Bothnia, a regularly built town, with a handsome stone church, a school, an infirmary, and about 600 houses and 3300 inhabitants. South of Wasa lies Christianstadt, a good sea-port on a peninsula, with a church, about 1200 inhabitants, and much trade. Kuopio, a circle east of the preceding, contains the town of Kuopio on a promontory of lake Kallavesi, with a church, school, well-frequented fairs, and about 1500 inhabitants. The circle of Uleaborg-Kayana, in the most northern part of the principality, contains Uleaborg, its capital, on the Ulea, a well-built town, with a town-hall, two market-places, a church, and hospital, about 400 houses, and a population of about 4500, who carry on some trade: Brahestad, a seaport, with a church, and about 1200 inhabitants: Padasjärviz-Kousoma, an inland town of about 1500: Kenii, a sea-port: and Tornea, on the river of that name at the northern extremity of the gulf of Bothnia, a neat town, with two churches, one on an island, and about 700 inhabitants; this place is the centre of the Lapland trade in deals, salt fish, reindeer-skins, butter, &c.

(Rühs *Finland*; Friccius; Meissner; Schnitzler; Hassel; Cannabich; &c.)

FINLAND, GULF OF. [BALTIC SEA.]

FINMARK. [NORWAY.]

FINS, a people from whom the present inhabitants of many of the most northern countries in Europe are descended, constitute a large proportion of the population of Eastern Russia, and of the countries adjacent to the gulfs of Finland and Bothnia and the Frozen Ocean. The name by which they are known among themselves is Suomilius, not Fins; nor do the Russians know them by this name, but by that of Tshukhutsys. The first mention of them under the denomination of Fins occurs in Tacitus, who says, in his 'Germania,' 'the *Fenni* ought to be ranked among the Germans.' They are apparently the Phinni of Ptolemy. Their present number is variously estimated: by some writers at 2,400,000, and by others at 3,000,000 and upwards. They are of Asiatic origin, and their dominion once extended from the sources of the Obi and the banks of the Volga to the shores of the Baltic, as far as the north-eastern parts of Prussia. The period of their migration westwards is unknown. Tacitus (cap. xlvi.) observes that the Fenni were a savage race, without arms, horses, or iron: their arrows were pointed with bone, and their principal occupation was hunting. In fact their own name, *Suomilins*, designates dwellers among swamps. Most writers conceive that their original abode was among the Ural mountains, whence they spread chiefly westwards; but in no part established themselves as an independent nation, except in Hungary, where they erected the kingdom of the Magyárs. Addicted to a wandering life, they were easily reduced to subjection by the Norwegians, Swedes, and Russians, in succession. The Norwegians began by the conquest of Finmark, whence they made inroads at various times on the territory of the Permians, a branch of the Fins, who inhabited the country in the vicinity of the White Sea. These inroads were ultimately arrested by the princes of Novgorod, who made themselves masters of Permia, and by the Moguls, who diverted the attention of the Norwegians to the defence of their own independence. The Russians next overran the Finnish territories, possessed themselves of Carelia and the whole of Permia; and in the fourteenth century, Stephen, one of their bishops, having planted the cross on the shores of the White Sea, overthrew the worship of the great Finnish deity, Yomala. The whole of Lapmark, together with all the Finnish tribes in the East, in Siberia, and along the Volga, at last yielded to the Russians, who drove back the Norwegians in their attempt to re-establish their dominion over Lapmark. The Swedes next fell upon the Finnish territory which lay within their borders. In the middle of the twelfth century, Erik the Pious converted the inhabitants of what is now termed Finland to Christianity; and about a hundred years afterwards Sweden possessed itself of Tavasteland, and those parts of Carelia and Lapmark which were not in the hands of the Russians. In this way the whole nation of the Fins was gradually reduced to their present state of dependence. By migration they have become more or less intermixed with the Bulgarians, Moguls, and even the Turks, whose ancestors had been their southern neighbours from time immemorial.

The Fins of the present day are commonly divided into two distinct branches; the Eastern or Uralian Fins, and the Western or Baltic Fins, both of whom may be identified as having a common origin by their physiognomy, habits, and general character and usages. The *Eastern* or *Uralian Fins* include the tribes settled in Siberia, and about the Volga, and comprehend the Mardvas or Mardvings, who inhabit the Russian territory adjoining the Oka and Volga; the Permians or Permiaky, and Siryanes, of Permia and portions of Orenburg; the Votyaks, on the banks of the Viatka; the Ostyaks in the government of Tobolsk, who are also called Khoriti and Konniyungs; the Voghals or Voghalitchi of Permia and Tobolsk; and the Teptiarys, who dwell about the Ural mountains and in the land of the Bashkirs. The *Western* or *Baltic Fins* comprise the Savolaiseths, Yemes or Hemelaiseths, Tavastes and Kayanes of Finland; and the Sames or Sameladz, who people Lapland, together with the tribes of the Kurs or Livys, of whom there are scanty remains in Courland and Livonia; the Tchudes or Esthians, who inhabit Esthonia; the Iyortis, who are found in Ingria; the Tsheremys and Tshuvaks, who are scattered over Nijegorod or Nishegorod and Casan; and the Kyrials, between Lake Peyena and the Kymen, as far as Lake Ladoga. Schubert, in his account of the Russian empire, gives the subsequent enumeration, which does not differ essentially from that of Vsevoloysky, whom we have followed in the preceding classification.

1. Laplanders or Sameladz . . .	22,000
2. Finlanders and Fins of Ingria and Carelia .	1,200,000
3. Esthes or Esthians	500,000
4. Livys and Kurs	1,000
5. Permians	35,000
6. Suryanes or Siryanes . . .	30,000
7. Voguls	100,000
8. Votyaks	100,000
9. Tsheromys	200,000
10. Tshuwashes or Tshuvaks . . .	370,000
11. Mordwines or Mardvings . . .	92,000
12. Ostyaks of the Obi . . .	108,000
13. Teptyarys	111,000
Total	2,869,000

The Fins differ wholly from the Sclavonians and Livonians. They have an alphabet and language peculiar to themselves. The majority are attached to agricultural pursuits; some few tribes are nomadic, and some devote themselves exclusively to hunting and fishing. They are of middling stature, but of a strong robust make: their characteristic features are a flat face with hollow cheeks, dark grey eyes, and light brownish hair, a thin beard, and sallow complexion. The Tsheremys or Tshermisses and Tshuvaks approximate somewhat to the Tartars in their exterior appearance, the Mardvings to the Russians, and the Voguls to the Calmucks. The Fins are a brave, honest, and hospitable race of men, but headstrong, frequently ferocious, and repulsive in their manners. Some tribes are so indolent that the name of Fin is in many parts synonymous with laziness; they have little activity of mind, and are notorious for their want of cleanliness. They are destitute of the vivacity and social qualities of the Russians, and are serious, reserved, and fond of a retired life.

The Fins are, with few exceptions, Christians. The Eastern were converted by their Russian masters to the Greek faith; the Western, who at first embraced the Roman Catholic religion, have mostly followed the example of their former masters, the Swedes, and embraced Protestantism. Among the tribes who adhere still to paganism are the Tsheremys, Mardvings, Voguls, and a few others. In point of civilization none are so advanced as the Finlanders: many possess a natural taste for music and poetry. The Hungarians are descended from the Yuigurys of the Ob, who are now divided into Ostiaks and Voguls. The latter have dark-brown or black hair, and their dialect much resembles the Hungarian.

The Fins have no nobility. The peasant, however, always gives precedence to the citizen or merchant, and holds every servant of the crown in high respect. Independently of husbandry, fishing, and the chase, they are in some parts employed in the manufacture of tar, and in building barks and boats. Their dwellings in general are at a distance from one another, and consist of three cabins, one for summer, another for winter, and a third for culinary purposes: these are surrounded by a yard, which also contains a barn and stable or stalls for cattle. Their women are thrifty and much devoted to their domestic duties; they weave coarse woollens and linens for the use of their families, and their winter attire differs little from that of the men.

The Fins are fond of ardent spirits; yet longevity is common among them.

FIR. [ABIES.]

FIRDUSI, ABUL CASIM MANSUR, a celebrated Persian poet, was born at the village of Shadab, in the district of Tus, in the province of Khorassan. The Persian biographers differ considerably in the date of his birth, some placing it in the beginning and others in the middle of the tenth century; but as Firdusi himself mentions in the last chapter of the 'Shah Nameh' that he completed that work A.H. 400 (A.D. 1009), and that he was then nearly 80, he must have been born about A.H. 319 (A.D. 931).

His father was a gardener, and is said to have had the management of a beautiful estate called Firdus (*i. e.* paradise), whence the poet obtained the name of Firdusi; though, according to another account, this name was given

to him by Mahmud in consequence of the excellence of his verses.

Firdusi appears to have spent the first fifty years of his life in his native village; till attracted by the encouragement which Mahmud gave to learning and the fine arts, he repaired to his court at Ghaznî, where his talents procured him an honourable reception. Soon after his arrival, Mahmud commanded him to write a history of the kings of Persia in verse, and promised to reward him with a thousand pieces of gold for every thousand couplets. The poet however preferred waiting for his reward till he had finished the work, which was completed, after a labour of thirty years, in 60,000 couplets. But instead of receiving the great sum he had anticipated, he was doomed to a cruel disappointment. It appears that he had offended some favourite courtiers, who prejudiced the mind of Mahmud against him, and accused him of having insulted the religion of the prophet by the praises which he had bestowed upon Zerdusht (Zoroaster) in his great poem. Instigated by these calumnies, Mahmud only sent him 60,000 silver dirhems. It is related that Firdusi was in the bath when the money was brought, and that disappointed and enraged at the meanness of the sultan, he distributed the whole sum among the attendants of the bath and the slave who brought it, adding, 'The sultan shall know I did not bestow the labour of thirty years on a work to be rewarded with dirhems.' In consequence of this insult, he was sentenced to be trod to death by an elephant, and with great difficulty obtained a revocation of the sentence. Feeling that he was no longer safe at Ghaznî, he left the city, after having written a bitter satire on Mahmud, which he gave to one of the courtiers, telling him that it was a panegyric on the sultan, which he must not present to his master till several days had elapsed. A translation of this satire is given by Sir William Jones, accompanied with the original Persian, in his *Poëseos Asiaticæ Commentarii* (Works, 8vo. edition, vol. vi., pp. 308-313), and also without the Persian in his *Traité sur la Poësie Orientale*, vol. xii., pp. 242-245.

The accounts given in the Persian biographies of Firdusi after his departure from Ghaznî are vague and unsatisfactory. The remainder of his life was spent in wandering from one kingdom to another, pursued by the emissaries of Mahmud, whose power was too much dreaded by the various monarchs of the East to allow them to harbour for any length of time the proscribed poet. He first took refuge with the governor of Mazanderan (Hyrcania), and afterwards fled to Bagdad, where he was hospitably received by the caliph Kadir Billah, who gave him the 60,000 pieces of gold which Mahmud had promised. While at Bagdad he is said to have added a thousand couplets to the Shah Nameh in praise of the caliph, and also to have written a panegyric on him in Arabic; but this statement is in all probability incorrect, since all trace of the latter is lost, and none of the copies of the Shah Nameh, collated by Mr. Turner, contain the former. During his residence in this city he is also said to have written the poem called 'Joseph,' which consists of 9000 couplets, in the same measure and style as the Shah Nameh, copies of which are now rarely met with even in the East. But even in the capital of the Abasside caliphs he was not secure from the power of Mahmud; the feeble Kadir Billah dared not disobey the commands of the sultan, and the unfortunate poet was obliged to seek in countries still more remote a safer retreat. It is uncertain at what court he next took refuge; but it appears clear from all accounts that his friends procured his pardon shortly after he left Bagdad, and that he eventually returned to his native town, where he died A.H. 411 (A.D. 1020), in the 89th year of his age. We know little of his family: the death of his son at the age of 37 is pathetically alluded to in the Shah Nameh, and his daughter is said to have refused the 60,000 pieces of gold, which were offered to her by the tardy justice of the sultan.

The Shah Nameh contains the history of the kings of Persia, from the reign of the first king, Kaiûmers, to the death of Yesdijird, the last monarch of the Sassanian race, who was deprived of his kingdom A.H. 21 (A.D. 641) by the invasion of the Arabs during the caliphate of Omar. During this period, according to Firdusi, three dynasties sat upon the Persian throne. The first, called the Pishdadian, lasted 2441 years. The second, the Kaianian, commenced with Kaikobad, and lasted 732 years. Alexander the Great, called Sikander by Firdusi, is included in this race, and is represented to be the son of Dârâb, king of Persia, by the daughter of Failakus (Philip of Macedon). After the death of Sikander, Persia was divided, during 200 years, into a number of petty monarchies called the 'confederacy of the kings.' The Sassanian race of princes succeeded these, and ruled over the whole of Persia for 501 years.

The poem of Firdusi is of little value as a history, though it certainly contains some of the antient Persian traditions. The whole history of Kaikhosrau, as related by Firdusi, bears so great a similarity to the account which Herodotus gives of the life of Cyrus, as to put it beyond doubt that both authors present us with a faithful and accurate representation of the same tradition. 'It is utterly incredible,' says Sir William Jones (Works, vol. iii., p. 166), 'that two different princes of Persia should each have been born in a foreign and hostile territory; should each have been doomed to death in his infancy by his maternal grandfather; should each have been saved by the remorse of his destined murderer; should each, after a similar education among herdsmen as the son of a herdsman, have found means to revisit his paternal dominion, and, having delivered it after a long and triumphant war from a tyrant who had invaded it, should have restored it to the summit of power and magnificence.' The leading circumstances in the life of Alexander the Great are also preserved in the Shah Nameh. We read of his victory over Dârâ (Dareius), of his marriage with Roshung (Roxana), of his expedition into India and defeat of Faûr (Porus), and of his journey through the desert to Mecca to consult two trees from which a voice proceeded, which is evidently only another version of his visit to the temple of Ammon in Libya. The Persian biographers all agree in asserting that Mahmud placed in the hands of Firdusi the antient chronicles of the kings of Persia, from which it is supposed that he derived the historical narratives extant in his great work. We have the testimony of the book of Esther (x. 2) to the existence of such records, as well as a strong presumption derived from the fragments of Ctesias and many parts of Herodotus. But it appears very unlikely that these chronicles should have been preserved for so many ages, considering the various revolutions which Persia experienced. There is a romantic story told in the preface to the edition of the Shah Nameh published by the command of Baysinghur Khan, which, though deserving of little credit, must not be omitted on account of its general currency in the East. It is related that Yesdijird, the last monarch of the Sassanian race, ordered all the chronicles of the kings of Persia to be collected and arranged, and that this book was known by the name of the Bastan Nameh. On the conquest of Persia by the Arabs it was found in the library of Yesdijird, and became in the division of the plunder the property of the Ethiopians, by whom it was conveyed to India; it was afterwards taken back again to Persia, where it remained unknown till a fortunate circumstance brought it to light in the reign of Mahmud. Little reliance can be placed on the existence of written documents in the time of Firdusi: the only value of the Shah Nameh, in an historical point of view, consists in the antient Persian traditions it has preserved; but it would require the learning and acumen of a critic like Niebuhr to arrive at the historical truth conveyed in the tradition, and to strip the real legend of the additions and embellishments of the poet. But it is not as a history that the Shah Nameh derives its reputation. Its poetry is read and admired by all well educated Persians even in the present day; and its author may be considered as the greatest of oriental poets, with the exception of Valmîkî and Câlidâsa. It is written in purer Persian than any other work in the language, and contains a very small number of Arabic words; it has thus become a model of Persian composition, and is as much distinguished in the East as the Homeric poems were in the West.

The copies of the Shah Nameh now met with vary greatly in the number of verses. 'It would be difficult to discover,' says Mr. Macan in his preface to the Shah Nameh, 'two copies which agree in the order of the verses or in the phraseology for [illegible]0 couplets together.' Whole episodes are omitted, verses [illegible]ected from every page, and it is not now uncommon to find MSS. which contain only 40,000 couplets, though originally the poem is said to have consisted of 60,000.' Mr. Macan adds, that he had never seen a MS. with more than 56,685 couplets; the edition published by himself contains only 55,204. There have been three at-

tempts made to collate MSS. of the Shah Nameh with the view of obtaining an accurate text.

1. The first was made by order of Baysinghur Khan, the grandson of Timur, A. H. 829 (A. D. 1426). The editor states in his preface that Baysinghur took great delight in reading the Shah Nameh, but found so many mistakes in the copies he used, that he ordered a fresh collation to be made in order to obtain an accurate copy for his own private use. The editor does not mention the MSS. he used; and this collation did not produce much benefit, as the copy was deposited in the king's library, to which no one was allowed access. All trace of it has disappeared; the preface alone is extant.

2. The second collation was made under the superintendence of Dr. Lumsden, professor of Arabic and Persian in the College of Fort William. Twenty-seven valuable MSS. were procured for this purpose; and the first volume containing an eighth part of the work was published at Calcutta in 1811.

3. The third collation was made by Mr. Turner Macan from 17 complete MSS. and four fragments containing the greater part of the work; all of which were written in Persian. The whole of the Shah Nameh was published by him at Calcutta, 1829, in 4 vols. 8vo.; this edition was printed at the expense of Nuscer-oodeen-Hyder, one of the native princes of Hindustan.

An epitome of the Shah Nameh in Persian made in A.D. 1657, by Shumshir Khan, is widely circulated in the East. There is also an abridgment of it in English in prose and verse by Mr. James Atkinson, London, 8vo., 1833; the same author had previously published at Calcutta in 1814, the episode of Sohrâb in English verse accompanied with the Persian text. The entire poem was translated into Arabic prose, A. H. 675 (A. D. 1277), by Caouâm-êddyn-Abul-Fateh-Isa, a native of Ispahan. A small portion of it was published by Wahl in the original Persian with a German translation and many valuable notes in the 5th volume of the *Fundgruben des Orients*, Wien. 1816, (pp. 109–131, 233–264, 351–389); which was reprinted by Vullers in a useful work for beginners, entitled *Chrestomathia Schahnamiana*, Bonnæ, 1833. The first eight books were translated by Champion in one volume, 4to., 1784; and a few extracts were also translated into English verse by Stephen Weston, B. D., Lond., 1815. Farther particulars of the life of Firdusi will be found in Silvestre de Sacy's translation of his life by Daulet Shah, published in the 4th volume of *Notices et Extr. des Manuscrits*, (pp. 203–238), and in the prefaces to the various works quoted above.

FIRE. [HEAT.]

FIRE-ARMS. [ARMS; ARTILLERY.]

FIRE-ENGINE, a term formerly applied to the steam-engine, but now confined to those machines which are employed to extinguish fires by throwing water from a jet upon the burning materials.

When we reflect upon the ravages which fires, whether accidental or kindled purposely by incendiaries, have occasioned in all ages, we may suppose that contrivances more or less appropriate have been at different times devised for extinguishing the flames or preventing them from spreading.

There were various modes of extinguishing fires previous to the invention of the modern fire-engine. A term employed by Juvenal and Pliny expressive of some implement used in extinguishing fires has given rise to some discussion. This term is *Hama*, which some commentators describe as a water-vessel; but Holstein contends that it was a very large hook or grapple fixed at the end of a long pole. Facciolati describes the *Hama* as a vessel used in putting out fires. Juvenal says in his 14th *Satire*, v. 305, &c.

> 'Dispositis prædives *hamis* vigilare cohortem
> Servorum noctu Licinus jubet, attonitus pro
> Electro, signisque suis, Phrygiâque columnâ,
> Atque ebore, et latâ testudine.'

In the above passage Juvenal alludes to the anxiety of the rich, who took precautions to meet the ravages of fire. 'The opulent Licinus bids his train of servants watch by night, the water-buckets being set ready, alarmed for his amber, and his statues, and his Phrygian column, and his ivory and broad tortoise-shell.' Pliny the younger speaks also of pipes (siphones) being used to put out fires. (lib. ep. x. 42.)

Augustus appointed seven bands of firemen in Rome, each of which had the care of two divisions (regiones) of the city: each band had a captain (tribunus); and at the head of the whole body was the præfect of the watch (Præfectus Vigilum). For further information the Title *De Officio Præfecti Vigilum* may be consulted. (Dig. i. Tit. 15.)

At the present day a species of squirt is used among oriental nations to extinguish fires.

With regard to such contrivances as might correctly come under the denomination of machines, it appears that they originated with Ctesibius, a distinguished Greek mechanician, who lived in Egypt in the reign of Ptolemy Philadelphus, and whose name is intimately connected with pumps of different kinds, and clepsydras, or water-clocks. Hero, a pupil of Ctesibius, describes a sort of forcing-pump with two cylinders, employed for the purpose of extinguishing fires. Apollodorus, architect to the Emperor Trajan, has left a description of a machine consisting of leathern bottles with pipes attached to them: when the bottle was squeezed, a jet of water flowed through the pipe, and was thus used to extinguish fires. Beckmann has found, in the accounts of many of the German towns, entries for the cost of machines, the existence of which would be very problematical without that evidence: thus, in the building accounts of the city of Augsburg for 1518, fire-engines are mentioned under the name of 'instruments of fire,' or 'water-syringes.'

But the earliest account on which we can depend of a machine at all resembling those now in use is given by a Jesuit named Caspar Schott in 1657. This account related to a fire-engine made by Hautsch, of Nuremberg. It consisted of a water-cistern about 8 feet long, 4 feet high, and 2 feet in width; and was drawn on a kind of sledge somewhat larger than the cistern. It was worked by 28 men, and a stream of water an inch in diameter was forced, by means of this engine, to an elevation of nearly 80 feet. Hautsch, like many other inventors, was unwilling to disclose the secret of its construction; but Schott supposed that it contained a horizontal cylinder, through which a piston worked, and thus produced a pump-like action.

In 1699 the king of France gave a patent-right to an individual of the name of Duperrier to construct fire-engines, under the name of *pompes portatives*, or portable pumps, and to keep them (17 in number) in repair and working order. Twenty-three years afterwards, the number of pumps amounted to 30, the management of which cost 20,000 livres annually.

We have seen an old engraving which purports that Mr. John Lofting, a merchant of London, was the inventor and patentee of the fire-engine. In one corner is represented the Monument, and in another the Royal Exchange. The engines are represented at work.

There are two important parts of a fire-engine which do not appear to have been brought into use for some time after such machines became general: we mean the flexible hose, or tube, and the air-chamber. Hautsch's engine, however, possessed the former, but not the latter. The purpose of a flexible tube is obvious, for it enables the operator to carry the stream of water in any direction from the engine; whereas without it the sphere of the engine's use is limited, from the impossibility of carrying the engine itself through narrow passages, &c.

The air-chamber is a contrivance which depends for its value on one of the most important laws of pneumatics, viz. the increased elasticity of air when compressed into less than its usual bulk. The manner in which the application of that principle increases the efficacy of fire-engines we shall treat of presently; but we may easily illustrate the action of an instrument without such an accompaniment, by reference to a common pump, in which we find that the water does not flow out in an equable continuous stream, but gushes forth at intervals every time the piston is raised by the action of the handle. Now it needs but little reflection to conclude that such a mode of projecting water against burning timbers, &c. must be very inefficacious when compared with that of a continuous stream. The addition of an air-chamber, therefore, which had been found of great advantage in different hydraulic machines, was an important improvement in the fire-engine.

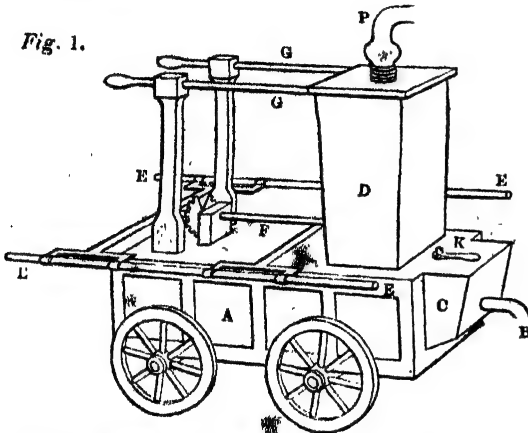
It is not exactly known who first applied this improvement, but an engine containing an air-chamber is stated by

Perrault to have been kept for the protection of the king's library at Paris in 1684. The first introduction of them, however, for common use appears to have occurred about the year 1720, when a mechanician named Leupold constructed engines consisting of a copper box securely closed and well soldered: each one weighed about 16 pounds, and ejected a continuous jet of water to a height of 20 or 30 feet. This engine contained one cylinder and piston.

The adaptation of leathern pipes was devised by two natives of Holland, both of whom were named Jan Vanderheide, and who were inspectors of fire-engines at Amsterdam in *1672. Five years after the invention*, a twenty-five years' patent for the privilege of making those pipes was granted to them; and in 1695 sixty of them were kept *in the city*, of which six were to be used at each fire.

After the introduction of these engines into England, improvements were from time to time made in them, by Dickenson, Simpkin, Phillips, Furst, Newsham, Rowntree, and others; but from the time that the air-chamber was introduced the principle of construction has been nearly the same in all of them, the points of difference being principally in minor details. In briefly describing one of the common engines, therefore, on the construction of Newsham, we shall convey a general notion of the mode of action of most of them.

Fig. 1.

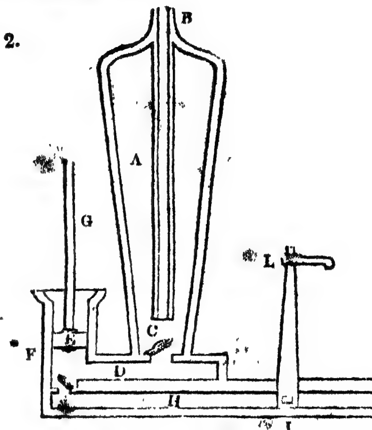


The annexed figure represents the outward appearance of the engine, such as our readers have doubtless frequently seen. The body, A, is about 9 feet long and 3 feet broad, inclosing the greater part of the mechanism of the engine. Along the lower part of this runs a metallic pipe, into which the water flows from the feed-pipe B, which is connected at the other end with a street plug or a cistern. If a supply of water cannot be obtained in this way, a cistern, C, is filled by means of buckets, and at the juncture between the cistern and the interior pipe a grating or strainer is placed, to free the water from dirt, gravel, &c. with which it may be mixed. The water having entered the interior pipe, is elevated and forced into the air-vessel by two pumps contained within the body of the box, D, and from the air-vessel is forced into the pipe P, which is connected with the leathern hose by which the propelled water is directed to the proper point. The two pumps are worked by a double lever connected with two long handles, E E E E, which are conveniently placed for being worked by several men, who alternately elevate and depress the end of the lever at which they are placed. This manual force may also be much augmented by one or two men standing on the body of the machine near F, who, holding by the bars G G, and treading alternately on each side of the fulcrum of the lever, on treadles conveniently arranged for that purpose, greatly increase the downward tendency of either side by throwing the weight of the body on that side. At K is a handle which *turns* a cock or valve, thereby regulating the supply of water to the interior pipe through the feed-pipe B.

Thus much for the exterior. We will now show the position and action of the air-chamber, and the connexion between it and the pumps; and in doing so we shall confine ourselves to that portion of the interior mechanism which is directly concerned with that part of the process.

Fig. 2 is a section through the middle of the air-chamber, and one of the pump-barrels. A is the air-vessel, made of metal, from the top of which proceeds nearly to the bottom a tube, B C, open at both ends. The air-chamber and tube are in communication with a horizontal pipe, D, which opens by two branches into two pump cylinders, one of which is hidden in the drawing, but the other is seen at F. Through this cylinder works the piston E, which is connected by the piston rod G with a toothed-wheel at the upper part (not given in the figure); to which wheel a reciprocating motion is given by the exterior levers to which it is attached. The horizontal pipe D, besides its communication with the air-vessel and the pump-barrel is also open to another horizontal pipe, H, which is connected at the other end with the feed-pipe shown in the former figure. These communications however are closed at different parts of the operation by two valves, one of which opens upwards from the pipe H to the pipe D; and the other also upwards from D to the air-vessel A. At the point I in the lower pipe is situated the cock, of which we have spoken, and the handle of which is seen at L.

Fig 2.



This being the relation of the parts to one another, let the reader now suppose the piston E and its rod G to have a reciprocating motion by the exertions of the men who are working the double lever on the outside of the engine, and he will be able to follow the rationale of the process. It must be understood that the piston-rods of the two pumps being connected with opposite sides of the fulcrum of the lever, it necessarily results that when one ascends the other descends, and *vice versâ*. The air chamber being full of air of the ordinary density of the atmosphere, and the cock I being opened, by which the pipe H becomes filled with water, we will suppose the piston to be drawn up to the top of the pump cylinder F. The consequent results are these: the piston draws up with it the air which the cylinder contains, and thus creates a partial vacuum beneath, because all communication with the external air is cut off. The valve between the two pipes having now a stream of water pressing it upwards, while the space above it contains rarefied air only, the valve is forced open, and the pump-barrel F and the pipe D become filled with water. When the returning stroke of the lever forces the piston down to its former position, the water is driven before it, but cannot return to the pipe H, because the valve communicating with the latter, opens upwards. It is therefore forced through the other valve into the air-vessel A. At the second upward motion of the piston a partial vacuum is again produced beneath it, but the water now contained in the air-vessel cannot return to fill that vacated space, on account of the mode in which the valve opens. A fresh supply is therefore gained, as before, from the pipe H through the valve communicating with D. This supply is, by the subsequent downward pressure of the piston, forced into the air-vessel, in the same manner as to the first portion. Thus each successive ascent of the piston causes a rush of water into the pump-barrel, and each descent urges that portion into the air-vessel.

We must now inquire what takes place in the air-vessel into which the water is thus forced. The air in this vessel has no communication with the external atmosphere except through the pipe B C, which is fitted air-tight into the neck of the vessel at B. When the water ascends in this vessel above the bottom of the tube at C, the air above that level becomes compressed into a smaller space, as all escape is guarded against. With this compression its elasticity is

also increased in the same ratio; and the effect of that increase we will now show. In the article BAROMETER it will be seen that the average pressure of the atmosphere, under ordinary circumstances, is about 15 pounds on the square inch, which is sufficient to balance a column of water about 33 feet high, or one of mercury 30 inches high; but when, through any external force, the air is compressed to one-half its former bulk, its elasticity is doubled, or becomes equal to the pressure of 66 feet of water. Now let us suppose that the influx of water into the air-vessel through the valve is such as to condense the air into half its former bulk: the contending forces are these—the air contained in the tube B C is pressing on the surface of the water beneath with a force of one atmosphere, or 15 lbs. on the square inch; while the condensed air in the vessel is pressing on the water with a force of two atmospheres, or 30 lbs. on the square inch. The latter pressure therefore exceeds the former by 15 lbs. on the square inch, and the water is driven up the tube with a force of that amount, which, as we have said, is sufficient to carry it to a height of about 33 feet. If the condensation of the air be less than the above, the effect will be proportionally diminished; but as long as the density exceeds that of the external air, so long will the water be forced up the tube; and thus a continuous stream is insured, which is the object desired. If the condensation be carried to a greater extent, the height to which the water will be ejected will increase in the same ratio; so that, if the bulk of the confined air were reduced to one-third, one-fourth, or one fifth of its original bulk, the ascensive power gained would be about 66, 99, or 132 feet respectively.

These are the principles on which all such engines act, although the arrangement of the mechanism may greatly vary. A construction somewhat different has been employed by Mr. Rowntree for the Sun and other fire-offices, in which the entrance of mud and gravel with the water from the feed-pipe is more effectually prevented. Many improvements, more or less valuable, have been suggested and partly acted upon within the last few years. A fire-engine composed entirely of metal has been constructed by Mr. Tilley, of London. Another, which is both efficient and portable, has been made by Mr. Merryweather, and is used principally as a stationary engine for the protection of large buildings. Engines on this construction have been made for the mansions of the dukes of Devonshire, Northumberland, and Rutland.

But the most important deviation from the general construction of fire-engines is the steam fire-engine of Mr. Braithwaite. This was first employed at a fire at the Argyle Rooms, in London, in 1830, and displayed great power in throwing the water on to the building. The furnace and boiler of this engine are similar to those of the 'Novelty,' a locomotive engine constructed by the same engineer for railway traffic. The pipe by which the water is jetted turns on a swivel, by which means the stream can be directed to any quarter. The cylinders are placed horizontally, and the steam-piston is connected with the water-pump plunger by a rod working through two stuffing boxes. The steam-cylinder is 7 inches in diameter, and the number of strokes of the piston from 35 to 45 per minute. The water-pumps are 6½ inches in diameter. This engine, the total weight of which did not exceed 45 cwt., consumed 3 bushels of coals in 5 hours, by which expenditure it was enabled to throw out from 30 to 40 tons of water per hour, which it propelled to a height of upwards of 80 feet, and on one occasion to 90 feet. When an alarm of fire is given, the fire belonging to this engine is kindled, and in 18 minutes the water in the boiler is brought to 212°; and by an ingenious contrivance, bellows are worked by the motion of the wheels, by which the heating of the water is hastened.

Another engine, on the same construction, by Mr. Braithwaite, possessed 10-horse power (the former being about 6), and ejected the enormous quantity of 90 tons of water per hour.

In 1832 a steam fire-engine was made for the king of Prussia by the same engineer, in which the steam could be got up in 20 minutes to a pressure of 70 lbs. on the square inch. This engine ejected the water through a pipe 1 inch in diameter to the height of 115 or 120 feet: the number of strokes of the piston was 18 per minute, and the body of water ejected about 1¼ ton in that time.

The power of steam has likewise been applied to a *floating* fire-engine by Mr. Braithwaite, the machinery of which is so constructed, that the power of the engine can be at once changed from propelling the vessel to working the pumps, and thus does double duty. To propel the vessel, the gearing of the coupling-boxes is connected with the paddle wheels; but in order to apply the engine to the propulsion of water the gearing is altered, and the engine brought into connexion with the pumps.

In many cases a supply of water is obtained for the extinction of fires in large buildings by having a reservoir at the top of the buildings, from which pipes are conducted to various parts; and cocks or valves in those pipes being opened, the water will flow downwards.

The construction of the leathern pipes, or hose, for fire-engines has received much attention. The pipes were occasionally made, in former times, of canvass, covered with cement; another plan was to weave them into perfect tubes; but the use of leather seems to be now fully established in this country. An improvement in the materials of these pipes is said to have been lately made in France, by the substitution of flax for leather. The pipes are woven in the same manner as the wicks of patent lamps, and may be made of any length, without seam or joining. When wetted they swell and become water-tight. It is said that they are more portable than leather, and not so susceptible of injury. The expense also is not more than half that of leather.

The leathern tubes, or pipes, are usually sown up in the manner of boots: but Messrs. Hancock and Tellers, of Philadelphia, a few years ago, devised a mode of fastening the seams by means of metallic rivets, which plan has received further improvements from Mr. Jacob Perkins, of London.

The difficulty of directing the play of the stream of water in an apartment enveloped in flames, without great danger to the fireman, induced Mr. Bramah, about 40 years since, to devise a boss, or nose, for the end of the pipe. This boss is hemispherical, and perforated with small holes, and when thrown into the middle of the apartment a minute stream rushes from each hole; and as the directions of the holes are arranged at all angles, within 180° of each other, the ceiling, wall, and floor, become saturated equally with water, which could not be the case with one large aperture. This was the intention of the inventor, but we do not know whether it has ever been acted upon.

Within a few years the firemen belonging to the different insurance companies in London have been formed into a body—the Fire Brigade,—the establishment of which has been found to be attended with very beneficial results—results indeed which generally follow the adoption of a system of combined operation. Still more recently a smoke-proof dress has been introduced among the corps, invented by Lieut.-Col. Paulin, of Paris. It is a kind of tunic or hood of leather, covering the head and bust, and is fastened round the middle of the body. Into the head of the covering are inserted two glass eye-pieces, and a leathern air-tube is fastened to the back of the dress. A small lamp, somewhat resembling those used by the metropolitan police, is fastened in front, and a whistle for giving signals is placed opposite to the mouth of the wearer.

FIRE-ESCAPE. The perilous situation of human beings in the upper part of buildings, when on fire, has roused the ingenuity of many persons to devise the means of escape; and as the subject is one of great importance, especially in large towns, the following observations may not be wi[illegible] their use.

The m[illegible]scaping through the window of a burning house are [illegible]y of two kinds; one from within by the individual [illegible]lf who is in danger, and the other by the assistance of other persons from without. Of the first kind is a contrivance invented by Mr. Maseres, some years since, in which an assemblage of straps, or belts, form a kind of seat for the individual, who holds in his hand a rope which passes through a series of holes in a block, and is, at the same time, connected with two hooks or clasps, fastened to the sill of the window. The individual, standing in one strap and bound by others, lowers himself to the ground by allowing the rope, which is attached to the block, to slide through his hands. Contrivances of this kind, whatever may be the ingenuity displayed in their construction, are liable to this serious drawback:—that they require a calm attention to minutiæ of fixing, adjusting, &c., at a moment when agitation and fear render the mind ill fitted for the observance of rules of conduct.

Among the multiplicity of fire-escapes which have been

devised, we will briefly mention a few for which premiums or medals have been awarded by the Society of Arts.

In 1809 Mr. Davis received a premium of fifty guineas for inventing an apparatus, which consisted of three ladders applied to each other by four clasp irons on the top of each of the two lowermost, which are so contrived that each ladder may slide into the one beneath it. On the top of the lowermost ladder two pulleys are fixed on the inside, over which two ropes pass, and are situated between the lower ladder and the middle one. The ropes are made fast to the bottom of the middle ladder on each side, in a proper direction with the pulleys at the top. The upper ladder is attached to the middle one in the same manner, and on the top it carries two horn-pieces, made of iron, and turned off at each end similar to two horns, which are four feet apart, and are sharp at the end to cling to the sides of the window, and thus keep the ladders steady. The compound ladder, which reaches to a height of about 45 feet, is fixed on a frame about 9 feet by 5, and drawn on wheels; and a windlass is so placed that the three ladders can be wound out from each other, and thus elevated to the position required.

In 1813 Mr. Young received a premium for a fire-ladder, consisting of a number of rounds, which form the steps of the ladder by being fastened to two ropes, which are suspended from an iron frame, terminating in hooks, which can be lodged on the sill of a window, and thus form a convenient ascent, which much resembles that of a common rope ladder. The rounds of the ladder are so made that they can be fitted to each other longitudinally, and elevated from the street in the form of a long straight rod, but without being detached from the ropes which are to form the two sides of the ladder. When the hooks at the top are fixed, a jerk at the bottom will unfix all the rounds from their vertical position, and allow them to fall into their proper places.

In 1816 a medal was presented to Mr. Braby for a contrivance, which consisted of a pole of any desired length, on the front of which is fastened a board or plank, fitted to a groove or rabbet in the back of a car, which, by means of this groove, slides upon the plank along the pole. A rope, attached to the car, passes over a pulley at the top of the pole, down a channel at the back of it (which is covered with plate-iron to guard the rope from injury by fire), and is then brought under another pulley at the bottom of the pole. With the assistance of this rope the car may be raised or lowered by persons below, and thus a communication established with an upper window.

Mr. Witty, in 1820, prepared a sort of settee, or chair, for a window recess, which may be hung on the sill of a window like a painter's machine. A bag is suspended from the chair, and is kept open by being made fast to a strong frame, and well secured by girth-web, which passes under it, and by which it hangs. These webs go over rollers, on one of which is coiled a sufficient quantity to reach from the top of the house to the bottom. When a person gets into the bag from a window the bag begins to descend, and as the web uncoils itself from the rollers it causes a flexible rope to wind round the middle part of the roller, by which means the descent is graduated.

The magistrates of Leith have within a few years caused several fire-ladders to be constructed for that town by Mr. Lamb, an inhabitant of Leith, on a principle somewhat resembling that of Mr. Davis, before [illegible], but more simple in its action.

Recently, two fire escapes, one by [illegible] and the other by Mr. Merryweather, have been [illegible] by several of the parochial authorities of London, and partially brought into use. That by Mr. Ford consists of a well-seasoned spar 35 or 40 feet long, capped with iron at the top, and having two projecting arms, furnished with prongs, by which a firm bearing against the wall of a house is obtained. The lower end is shod with iron, terminated by a spike to enter the ground. Just below the cap at the top, a grooved pulley is mortised into the spar, and a corresponding pulley is placed near the bottom. An endless rope runs round these two pulleys, at one point of which is attached a main rope; and another point of the endless rope is fastened to the semicircular brace of a large grooved roller, which traverses up and down the spar between the two pulleys. This brace carries a hook on the inner side of the spar, to which a car or cradle is fixed, by which persons may be lowered to the ground. The cradle, which consists of a seat and foot-board suspended from a cross head, and has a belt buckled round it, is drawn up by a rope passing over the pulleys.

The other contrivance, and the last which we have space to notice, is by Mr. Merryweather. It consists of ladders about six feet long, all of which are made exactly alike, the upper end being smaller than the lower: each end is furnished with a pair of iron loops or sheaths, so contrived that the top of each ladder can be inserted into the loops at the bottom of another, and thus several can be joined end to end. The top of the upper ladder, when employed at fires, is made to wheel along the front wall in ascending by an ingenious appendage contrived by Mr. Baddely; which consists of two short side-pieces corresponding in form to the bottom part of a ladder. On the upper part is an iron axle carrying a pair of small light wheels. A semicircular connecting rod of iron preserves the proper position of the side-pieces when not mounted on the ladder. Each end of the axle is provided with rising springs similar to those in an umbrella-stick, which allows the wheels to be slipped on the axle, but effectually prevents their sliding off again until the springs are depressed. This apparatus is fitted on to the top of the ladder, in the same manner as one ladder is fitted to another.

Seven lengths of this ladder have been fitted to each other, and raised in half a minute by three persons; and by means of a pulley, passing over the top of the ladder, we have seen three persons descend from a height of 30 feet, by a belt fastened round the body, in about two minutes and a half.

Whatever kind of fire-escape be preferred, it is necessary that the localities where they are deposited and the mode of using them should be well and generally understood.

FIRE-FLY. [Elateridæ; Lampyris.]

FIRE, ST. ANTHONY'S. [Erysipelas.]

FIRE, GREEK, an invention of the middle ages which was often employed in the wars of the Christians and Saracens. This subject has given rise to much inquiry and excited much discussion; the obscurity by which it is enveloped has been greatly increased by many causes, and especially by the love of the marvellous.

According to Gibbon, the deliverance of Constantinople in the sieges of the seventh and eighth centuries 'may be chiefly ascribed to the novelty, the terrors, and the real efficacy of the Greek fire. The important secret of compounding and directing this artificial flame was imported by Callinicus, a native of Heliopolis in Syria, who deserted from the service of the caliph to that of the emperor.'

It is justly observed by Gibbon that 'the historian who presumes to analyse this extraordinary composition should suspect his own ignorance and that of his Byzantine guides, so prone to the marvellous, so careless, and in this instance so jealous of the truth. From their obscure and perhaps fallacious hints, it should seem that the principal ingredient of the Greek fire was naphtha, or liquid bitumen, a light, tenacious, and inflammable oil which springs from the earth, and catches fire as soon as it comes in contact with the air. The naphtha was mingled, I know not by what method or in what proportion, with sulphur and with the pitch that is extracted from evergreen firs.' One of the properties here stated to belong to naphtha is well known to be and indeed is obviously incorrectly ascribed to it; if it were spontaneously inflammable it could not even be collected, and of course could not be mixed with the other ingredients which are named. Whatever may have been the precise nature of the mixture, the account of its effects, from which somewhat of the marvellous must be deducted, is thus strikingly portrayed by Gibbon:—'From this mixture, which produced a thick smoke and a loud explosion, proceeded a fierce and obstinate flame, which not only rose in perpendicular ascent, but likewise burnt with equal vehemence in descent or lateral progress; instead of being extinguished, it was nourished and quickened by the element of water; and sand, urine, or vinegar were the only remedies that could damp the fury of this powerful agent, which was justly denominated by the Greeks the *liquid* or the *maritime* fire. For the annoyance of the enemy, it was employed with equal effect by sea and by land, in battles or in sieges. It was either poured from the ramparts in large boilers, or launched in red-hot balls of stone and iron, or darted in arrows and javelins, twisted round with flax and tow which had deeply imbibed the inflammable oil; sometimes it was deposited in fire-ships, the victims and instruments of a more ample revenge, and was most commonly blown through

long tubes of copper, which planted on the prow of a galley, and fancifully shaped into the mouths of savage monsters, that seemed to vomit a stream of liquid and consuming fire.' According to Gibbon, the secret of the Greek fire was confined above 400 years to the Romans of the East; it was at length either discovered or stolen by the Mohammedans; and in the holy wars of Syria and Egypt they retorted an invention contrived against themselves on the heads of the Christians. The *feu Gregeois*, as it is styled by the more early of the French writers, is thus described by Joinville: 'It came flying through the air, like a winged long-tailed dragon, about the thickness of a hogshead, with a report of thunder and the velocity of lightning; and the darkness of the night was dispelled by this deadly illumination.' The use of Greek fire was continued to the middle of the 14th century, when the more efficient employment of gunpowder was substituted. When Ypres was besieged by the Bishop of Norwich in 1383, the garrison defended itself with Greek fire. In a curious paper on the subject of Greek fire by the late Dr. MacCulloch (*Royal Inst. Journal*, vol. 14), he remarks that very different things were known by one name, and he supposes the various projectile means and combustibles employed to have been essentially different.

FIRENZE. [FLORENCE.]

FIRKIN, a measure of ale, beer, and some dry commodities, now disused. Eight gallons of ale, soap, or herrings, made a firkin, and nine gallons of beer. But by a statute passed in 1689, the distinction between the firkin of ale and beer was abolished, except only in London, and eight and a half gallons were declared to make a firkin.

FIRM. [PARTNERSHIP.]

FIRMA'N or FIRMAU'N, is the name of the decrees issued by the Turkish Sultan, which are signed with his own cipher or signet. Such are the firmauns by which he appoints the various pachas and other great officers of the state. Firmaun is also the name of a kind of passport which the pachas are in the habit of granting to travellers, especially Europeans, by which they enjoin the subordinate authorities to give the bearer protection and assistance. The 'firmaun of death' was a sentence of summary execution issued by the sultan against a pacha, the written order for which was entrusted to a chiaous, or state messenger, whose duty it was to see it executed.

FI'ROLA. [NUCLEOBRANCHIA'TA; CARINARIA, vol. vi. p. 294.]

FIRST FRUITS (Primitiæ), the profits of every spiritual living for one year, according to the valuation thereof in the king's books. [ANNATES.] They were claimed by the pope throughout Christendom; in England his claim was first asserted in the reign of King John, and then only so far as related to clerks whom he appointed to benefices. Afterwards, by Pope Clement V. and John XXII., about the beginning of the fourteenth century, they were demanded and taken by the pope from all clerks, by whomsoever presented. By the statutes 25 Henry VIII. c. 20, and 26 Henry VIII. c. 3, first fruits and tenths [TENTHS] were taken from the pope and given to the king. In the thirty-second year of the same king's reign a court was erected for the management of them, but it was soon after abolished. Ultimately Queen Anne gave up this branch of the royal revenue to be applied towards the augmentation of small livings. [BENEFICE.]

First fruits arising in Ireland were by the 2nd Geo. I. c. 15, directed to be applied for the same purpose; but by the 3rd and 4th Will. IV. c. 37, the payment of first fruits in Ireland is abolished. (1 Bl. *Com.*; 2 Burn. *Eccl. Law*.)

FIRTH. [FRITH.]

FISC, FISCUS, was the name given under the Roman empire, and afterwards in the monarchies which rose on its ruins, to the private treasury of the sovereign, as distinguished from ærarium, or the treasury of the state. The fiscus was chiefly replenished by fines and confiscations, and unclaimed property of deceased persons: the taxes and other revenues of the country were paid into the ærarium. Under absolute monarchies, however, the two treasuries have been often confounded both in name and in reality. Under the feudal system, fiscus regius and fiscales terræ signified the domains of the crown, and the peasants attached to those domains were called fiscalini. Fiscus by degrees came to be used figuratively for the rights of the crown in civil as well as criminal matters, and the king's attorney was called procurator fisci, procureur fiscal in French, avvocato fiscale in Italian. Fiscus, in the sense of 'feudum regium,' or fiefs granted by the crown, was contrasted with proprietas, or an allodial estate. The word fiscus meant originally a basket or frail in which the monies of the prince were collected. (Ducange.)

FISH (French, poisson; German, fisch), a name applied to all the species of a class of animals occupying the lowest station of the four great divisions of the section vertebrata.

A fish may be defined as a vertebrate animal, breathing through the medium of water by means of branchiæ, or gills, having one auricle and one ventricle to the heart, cold red blood, and extremities formed for swimming.

Having given the ordinary definition of a fish, it may now be well to proceed with a short account of fishes in general.

In considering fishes, perhaps the most important thing which offers itself to our attention is the apparatus called the branchiæ, or gills. This apparatus is situated on each side of the neck, and consists of numerous laminæ fixed on arches. These laminæ are covered with innumerable blood-vessels, and are so constructed as to present a considerable surface to the water, so that the blood may receive a sufficient portion of the oxygen contained in that element. As the water in contact with the gills becomes deteriorated, it is necessary that a constant current be caused to flow over them. In most fishes this is effected by their taking the water in at the mouth and expelling it from under the gill-covers. The blood, which is constantly sent to the branchiæ from the heart, is distributed by means of the arteries to every part of the body, whence it returns to the heart by means of the veins.

As the breathing apparatus in the fish is suited to aquatic habits, so likewise is every part of its structure. The body is generally of an elongate oval, compressed form, covered with scales directed backwards, and furnished with fins; thus being beautifully adapted for swimming. Many fishes moreover have a bladder filled with air situated immediately beneath the spine, by the dilatation or compression of which their specific gravity is said to be varied. The thoracic part of the body is thrown forwards towards the head (so that fishes may be said to have no neck), and thus the hinder part of the body is more free and fitted for motion. The limbs are formed into fins, the fore-legs constituting what is termed the *pectoral fins* (*fig.* 1 *a*), and the posterior extremities the *ventral* (*fig.* 1 *b*): besides these fins ordinary fishes are furnished with one or two *dorsal fins* (*fig.* 1 *c c*), an *anal fin* (*fig.* 1 *d*), and a *caudal fin*, or tail.

All these fins are not always present, nor when present are they always in the same relative positions; and we shall hereafter find that both the absence of certain fins, and the peculiar position of these organs, afford characters in the classification of fishes. The fins consist of a thin elastic membrane supported by rays. The rays are of two kinds—those which consist of a single bony piece, usually hard and pointed, are termed *spinous rays*; and when the rays are formed of numerous portions of bone united by articulations, and frequently divided longitudinally into several filaments, they are called *flexible rays*. The principal organ of motion is the tail, the dorsal and ventral fins apparently serve to balance the fish, and the pectorals to arrest its progress when required.

The bones of fishes are of a less dense and compact nature than in the higher orders of animals, and always remain in an isolated state, similar to that of the embryo of the mammalia. The skeleton may be divided into four chief parts—the vertebral column, the head, the respiratory apparatus, and the limbs. The vertebral column consists of vertebræ which are concave at each end and pierced in the middle; and when joined together the hollow space between each two is occupied by a gelatinous substance, which passes from one space to the next through the hole in each bone. This hole is usually very small, but in some of the Chondropterygians it is so large that the bodies of the vertebræ are mere rings. To the vertebræ are attached the ribs; in fact, the ribs are the main support of all the other bones. The head varies more in form than in any other class of vertebrate animals. The same bones as those found in other oviparous animals are almost always traceable. We shall confine our observations to those which are most frequently referred to in technical descriptions.

The upper jaw consists of maxillary and intermaxillary bones; in the greater number of fishes the intermaxillary bones (*fig.* 1, *e*) constitute the chief portion of the upper jaw, the maxillary bones (*fig.* 1, *f*) being placed behind and

parallel to them and articulated to the vomer (*fig.* 3, *l*). In the salmon tribe, and some other fishes, however, the intermaxillary bones (*fig.* 2, *e*) are smaller in proportion, and form a continuous line with the fore-part of the maxillary bones (*fig.* 2, *f*). In the Chondropterygians the maxillary and intermaxillary bones are reduced to mere rudiments, their functions being performed by the bones analogous to the palatines, and sometimes by the vomer.

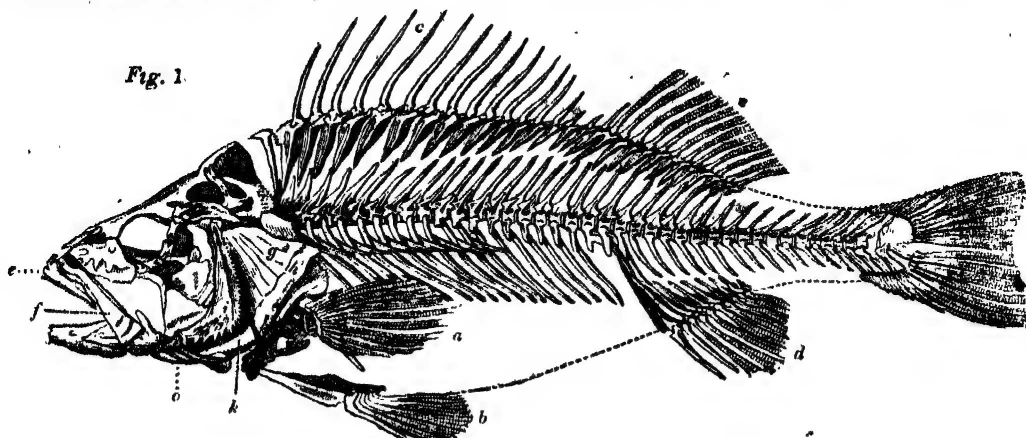
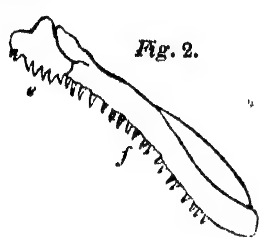


Fig. 1. Skeleton of the Common Perch.

a the pectoral fin; *b*, the ventral fin; *cc*, the dorsal fins; *d*, the anal fin; *e*, the intermaxillary bone; *f*, the maxillary bone; *g*, the operculum; *h*, the sub-operculum; *i*, the pre-operculum; *k*, the inter-operculum.



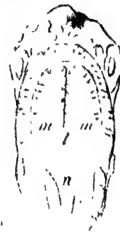


Fig. 2. Upper Jaw of a Trout
e, the intermaxillary bone; *f*, the maxillary bone.
Fig 3 Front view of the mouth of a Trout
l, the vomer furnished with teeth; *m m*, palatine bones also furnished with teeth; *n*, the tongue with recurved teeth

The *lower jaw* is generally composed of at least two bones on each side, the dental portion in front, and the articular portion behind.

The *palatines* (*fig.* 3, *m m*) are extended longitudinally on each side, and form part of the roof of the mouth; they are often furnished with teeth.

The *opercular bones*. The chief portion of the sides of the head behind the eye consists of the opercular bones: these are generally four in number, and are termed the *operculum* (*fig.* 1, *g*), the *sub-operculum* (*fig.* 1, *h*), the *pre-operculum* (*fig.* 1, *i*), and the *inter operculum* (*fig.* 1, *k*). The first of these covers the gills.

The *Branchiostegous rays* (*fig.* 1, *o*), which are often mentioned in descriptions, are situated under the opercular bones.

The *teeth* in fishes are almost entirely osseous; they are usually of a simple spine-like form, and recurved at the tip. Teeth are found in almost every bone in the interior of the mouth; in the superior and inferior maxillary, and intermaxillary bones; likewise on the branchial arches, pharangeal bones (which are situated in the throat), and on the tongue. There is considerable variety in their structure, as will be found in the various descriptions of fishes found in other parts of this work.

The *scales* are composed of two substances, one resembling horn in its texture, and the other of a harder and bone-like nature; they are generally attached to the skin by their anterior edge, and consist of numerous concentric laminæ (secreted by the skin), the smallest of which is first formed. Certain scales, forming a continuous series, in a slightly waved line from the head to the tail of the fish, are pierced in or near their centre, and furnished with a tube through which a slimy matter is poured, which serves to lubricate the body of the animal. This series of tubes forms a line visible on the sides of the body, and which is termed the *lateral line*.

The structure, form, and position of the scales of fishes are very variable, and have furnished M. Agassiz * with characters for a new classification of these animals.

As regards the senses, those of taste and touch appear to be but slightly developed in fishes. When we find the tongue thickly covered with teeth (as is often the case), and used as an organ of prehension, and when we consider the quick manner in which the food is swallowed, it would certainly appear that their sense of taste is very slight. The sense of touch is probably most developed in the cirrhi attached to the mouth of those fishes that have them. The long filaments with which the fins of some fishes are furnished also perhaps serve, through the sense of touch, to indicate the vicinity of weeds, or other objects in the water.

The eyes are differently placed in the various species of fishes, in accordance with their habits: for the most part they are placed laterally, and in some (those that live at the bottom of the water) we find them directed upwards. In some of the species of sharks (those of the genus *Zygæna*) they are situated at the end of an elongated lateral process on each side of the head.

The sight in fishes is acute, the range of vision however is probably somewhat limited. The eyes (which are furnished with a spherical lens) are generally large: but in some species they are very small, whilst others appear to be destitute of them.

Although fishes appear not to possess certain portions of the auditory apparatus, observed in animals of a higher grade, they nevertheless possess the sense of hearing.

There are reasons for the belief that the sense of smell in fishes is tolerably acute: their olfactory nerves are of large size, and disposed over a considerable extent of surface.

By far the greater number of fishes are of carnivorous habits; there are some however which feed upon vegetable substances, and we find the stomach modified accordingly as in other animals.

The sexes of fishes, if we except the sharks and rays, offer no very decided external characters by which they may be distinguished: as in the higher animals, however, observes Mr. Yarrell, 'the respiratory organs occupy more space in the males than in the females; and, on the other hand, the abdomen is larger in the females than in the males: the males may therefore be known from the females by their somewhat sharper or more pointed head, the greater length of the gill cover, and the body from the dorsal fin downwards being not so deep compared with the whole length of the fish.'

The sexual organs of fishes are in the generality of the species of a more simple nature than is observed in the higher orders of the vertebrata, 'consisting, as will be found, towards the season of producing their young, of two elongated oval lobes of roe, one on each side of the body, placed between the ribs and the intestinal canal; the lobes in the female, called hard roe, contain a very large number of roundish grains, called ova or eggs, which are enclosed in a delicate membranous tunic or bag, reaching to the side of the anal aperture, where an elongated fissure permits egress at the proper time. In the males, the lobes of roe are smaller than in the females, and have the appearance of two elongated masses of fat, which are called soft

* See the 'Recherches sur les Poissons Fossiles' of Louis Agassiz.

roe; they remain however firm till the actual season of spawning, when they become by degrees more and more fluid, and the whole is ultimately voided by small portions at a time under slight abdominal pressure. * * *

'At the season for depositing the spawn, which varies with almost every genus, some species repair to the gravelly shallows of rivers, and others to the sandy bays of the sea. This movement is called by fishermen "going to hill, or roading;" other species resort to bunches of weeds. In many instances, when ready to deposit her spawn, a female is accompanied by two males, one on each side,—a provision of nature which seems intended to secure the impregnation of the largest quantity of ova, and the range of the influence of the male fluid is enormously increased by diffusion in water. The adhesive nature of the surface of each egg supplies the means of attachment to any of the various substances near which it may happen to be left; and the time required for the appearance of the young fish is very variable, depending upon the species, the season, and its temperature. The young fish is first apparent as a line wound round the central vitelline portion of the egg, and ultimately escapes by rupturing the external capsule with its tail.'

We now proceed to give an outline of Cuvier's classification of fishes, since it is that which is perhaps most generally adopted: it is nevertheless in many respects very artificial.

Fishes are divided by this author into two series, that of ordinary fishes, or *Ossei**, distinguished by having the skeleton bony; the osseous matter being disposed in fibres; the sutures of the cranium distinct; maxillary and intermaxillary bones, either one or both present: and that of the Cartilaginei or Chondropterygii, distinguished by having the skeleton cartilaginous; the bones destitute of fibres; sutures of the cranium indistinct; maxillary and intermaxillary bones either wanting or rudimentary, their place being supplied by the palatine or vomer.

These two series are subdivided as follow:—

Series 1. Ossei.
Section 1. Pectinibranchii.
Order 1. Acanthopterygii.

Family Percidæ	Family Theutyes
Loricati	Pharyngiens labyrinthiformes
Sciænidæ	Mugilidæ
Sparidæ	Gobiadæ
Mænidæ	Lophiadæ
Squamipinnati	Labridæ
Scombridæ	Centriscidæ
Tænioidæ	

Order 2. Malacopterygii.

1. Abdominales	2. Subbrachiales
Family Cyprinidæ	Family Gadidæ
Esocidæ	Pleuronectidæ
Siluridæ	Discoboli
Salmonidæ	Echeneididæ
Clupeidæ	

Order 3. Apodes
Murænidæ
Section 2. Plectognathi
Gymnodontidæ
Sclerodermi
Section 3. Lophobranchii
Syngnathidæ
Series 2. Cartilaginei or Chondropterygi
Order 1. Eleutheropomi
Sturionidæ
Chimæridæ
Order 2. Plagiostomi
Squalidæ
Raiidæ
Order 3. Cyclostomi
Pteromyzidæ

The characters of the two great series or sections into which fishes are divided it has been shown are taken from the nature of the skeleton. It remains for us now to make a few observations upon the minor subdivisions.

In the *Ossei*, or bony fishes, there are three sections. Those of the first, the Pectinibranchii, possess the following characters:—Branchiæ in continuous pectinated ridges, furnished with an opercular and branchiostegous membrane; jaws complete and free. Section 2, Plectognathi:—Branchiæ with the pectinations continuous; opercule and rays concealed beneath the skin; external aperture a simple cleft; jaws incomplete; maxillary firmly attached to the side of the intermaxillary, which alone forms the jaw; palatine arch united to the cranium by suture, and immovable. To this section belong the globe-fishes, file-fishes, &c. Section 3, Lophobranchii:—Branchiæ in small tufts; opercule large, confined on all sides by a membrane, with only a small hole for the external aperture; branchiostegous rays rudimentary; jaws complete and free. To this section belong the pipe-fishes, hippocampus, &c.

The two latter sections contain but a limited number of species: the *Pectinibranchii*, on the contrary, contain all the ordinary and typical fishes, and, as is seen in the foregoing list, is subdivided into three orders. The fishes of the first of these orders, the *Acanthopterygii*, are distinguished by their having the anterior part of the dorsal, anal, and ventral fins furnished with simple spinous rays. The perches, mullets, gurnards, mackerels, &c., therefore belong to this order. In the second order, the *Malacopterygii*, all the fin-rays are flexible, with the exception sometimes of the first ray of the dorsal and pectoral fins. The three principal divisions of the *Malacopterygii* are founded either upon the position of certain fins, or their absence. In the first division, the *Abdominales*, the ventral fins are situated far behind the pectorals; as in the carp, tench, bream, dace, roach, pike, salmon, &c. In the second group, the *Subbrachiales*, the ventral fins are situated immediately beneath the pectorals (or even a little before them); as we find them in the cod-fish, haddock, and whiting. The flat fishes also belong to this group—such as the plaice, flounder, turbot, sole, &c. To the third and last of these greater divisions of the Malacopterygii belong the eels, which have received the name Apodes, from their possessing no ventral fins.

In illustration of the three orders into which the Cartilaginei is divided, the Sturgeon will serve as an example of the first, or the *Eleutheropomi*. The *Plagiostomi* contains the Sharks and Rays; and the Lampreys and Myxines *chiefly* constitute the Cyclostomi.

FISHER, JOHN, bishop of Rochester, was born at Beverley in 1456. He was educated at the collegiate school of his native place, and after some residence there removed to Michael House College, Cambridge, of which he became master in 1495. The patronage of Margaret countess of Richmond, Henry the Seventh's mother, first brought him into notice. The respect in which she held his character and her high opinion of his learning induced her to appoint him her chaplain and confessor. He was named the first 'Lady Margaret's Professor of Divinity' in the University of Cambridge, and became bishop of Rochester in 1504. It was some years after this time that the actions of this prelate first gained him an historical notoriety. When Henry VIII. (1527) was anxious to prove both to himself and to others the illegality of his marriage with Catherine of Aragon, he applied to the bishops for their opinions in the matter. One bishop alone refused to sign a declaration that the marriage was unlawful: this bishop was Fisher. Other persons indeed affixed his signature to the paper, affirming that they had his permission to do so; but the bishop resolutely denied that he had given them his consent; for in his conscience he believed the marriage to be valid. This refusal, and his continued advocacy of queen Catherine's cause, made him many powerful and lasting enemies. Not only did he become hateful to the king, who was desirous for the divorce, but the whole parliament took umbrage at his conduct. Sir Thomas Audley, then speaker, and thirty members of the House of Commons, were sent to complain to the king of certain derogatory words which Fisher was declared to have used respecting the assembled representatives; and it was with difficulty that he could persuade them to receive his explanation. Four years after, when both the parliament and the convocation were in debate upon the expediency of denying the pope's supremacy (1534), Fisher again stood alone. He dissented from all the other bishops, and could not, either by persuasion or argument, be induced to concur with their opinion. An event was now at hand which laid the foundation of his ruin. The imposture of Elizabeth Barton, the nun of Kent, was exposed by the diligence of Cranmer and others; and while the principal agents were condemned to death, it was likewise deemed fit that those who had been privy to the deception should not escape unpunished. Among these was Fisher, who, knowing this woman and her associates to be

* Cuvier gave no name to this section; the one here used is that given by Mr. Jenyns: other sectional names have also been taken from the same author.

impostors, disgraced himself by not exposing the imposition: he made many vain excuses, but was found guilty of misprision of treason. It does not appear that the king proceeded against him upon this charge till he was moved by new provocations. When the oath touching the succession and the king's supremacy was offered to him, the bishop of Rochester, as Sir Thomas More had done, refused to swear it. The king, now more than ever irritated against him, caused him to be indicted upon the statute and committed to the Tower: 'his bishoprick was seized,' says Burnet (*Hist. Reformation*, vol. i.), 'and all his goods taken from him; only some old rags were left to cover him; and he was neither supplied well in diet nor other necessaries, of which he made sad complaints.' Books were also denied him lest he should write against the king's marriage or supremacy. These inexcusable severities met with the most bitter censure of the Roman Catholic party; while many of the Reformers, especially the Lutheran preachers who had frequently been persecuted by Fisher (see Burnet, *Hist. Ref.*, part i., book 2), privately rejoiced in his misfortunes. During his imprisonment Pope Clement, in spite to the king, and in kindness to Fisher, sent him a cardinal's hat. When the king heard of this, he desired that the bishop might be examined about it; but Fisher protested that he had used no endeavours to procure it: nevertheless his new dignity precipitated his ruin. His continued denial of the king's supremacy was no longer passed over: on the 17th of June, 1535, he was called to account for this offence. The Lord Chancellor, the duke of Suffolk, and some other lords, together with the judges, were appointed commissioners for his trial; he was found guilty, and condemned to die as a traitor. On the 22nd of June he was beheaded.

The character of Fisher is remarkable for firmness. In his steady maintenance of the fallen cause of queen Catherine, undaunted by the anger of the vindictive king, this quality peculiarly shone forth. Again, with regard to the supremacy, the obstinacy and tyranny of Henry VIII. were before him; it was clear that no circumstances or reasoning would alter the opinions of his opponents; if *he* did not change, certain persecution awaited him. He might have followed the example of numbers who, though zealous for papacy, had now deserted its cause: the spirit of the time was not only lenient to but favoured this species of hypocrisy. But, notwithstanding all this, Fisher was immovable, not being convinced that he was in the wrong; his fearless firmness allowed him to maintain an open profession that he was in the right. He was a learned and devout man, and his conduct fully proved his sincerity. (Burnet's *Hist. Ref.*)

FISHERIES are localities frequented at certain seasons by shoals or great numbers of fish, sometimes of one particular description only, where they are taken upon a large scale. The right of frequenting these fishing-grounds has frequently been matter of dispute between governments, and sometimes the subject of treaties, while exclusion from them or invasion of presumed exclusive rights to their enjoyment has been the cause of warlike preparations. The principal kinds of fish which are the object of these systematic occupations are cod, ling, hake, herrings, lobsters, mackerel, oysters, pilchards, salmon, whales, anchovies, sardinas, sturgeon, and tunny. With the exception of the four last-named descriptions, the fishermen of this country are engaged in the taking of all these fish, and pursue their calling to an extent which makes each an important branch of national industry. The quantity of other fish taken by British fishermen is in the aggregate exceedingly great, and furnishes constant employment throughout the year to a great number of men on almost every part of the coasts of Great Britain and Ireland; but it has not been usual to apply the word fisheries otherwise than as we have already mentioned.

Of the British fisheries, some are carried on in rivers or their estuaries, and others in the bays or along the coasts. Our principal cod-fishery is on the banks of Newfoundland; and for whales our ships frequent the shores of Greenland, Davis's Straits, and the South Seas. Of late, whale-fisheries have also been carried on near the shores of New Holland and of the Cape of Good Hope.

The Appendix to the Report of the Commissioners of Inquiry into the State of the Irish Fisheries, which was presented to parliament in 1836, contains an historical sketch of the progress of the British and Irish fisheries, drawn up by Sir T. C. Morgan, M.D., one of the commissioners; and from this sketch the following particulars are principally taken:—

The taking of herrings was extensively pursued in Scotland in the ninth century, and continued until the Convention of Royal Burghs prohibited the exportation of fish before the resident population was supplied at a stipulated price. In consequence of this interference, many of the fishermen abandoned the pursuit at home, and settled in Holland—a circumstance which first drew the attention of the Dutch to the value of the Scotch fisheries. Several enactments were passed under James III., IV., and V. of Scotland for the promotion of the fisheries; and James VI., before his accession to the English throne, directed the building of three towns for the same purpose; but this measure failed of success. In 1633 Charles I. ordained 'An Association of the three kingdoms for a general fishery within the hail seas and coasts of his majesty's said kingdoms.' A standing committee was named for the government of the Association, which was joined by many persons of distinction. For the encouragement of this adventure the king ordered that Lent should be strictly observed; but the breaking out of the civil war put an end to this scheme. In 1654 the government, in order to give protection to the fisheries, remitted in favour of Sir Phineas Andrews, who had embarked in the same, the salt duties and 'customs, and excise duties upon all naval necessaries;' besides which, voluntary collections were made from wealthy and patriotic individuals for building wharfs, docks, and storehouses, and for defraying other expenses. These measures of 'protection' appear to have been unsuccessful; for six years later we find that the fisheries were undertaken by Simon Smith, who, in addition to all the advantages conceded to Sir Phineas Andrews, was also allowed the free importation of all commodities imported, in return for fish shipped to foreign countries. Charles II., on his restoration, appointed, in 1677, a 'Council of Royal Fishery,' to which the duke of York, the earl of Clarendon, and other persons of honour and wisdom were named, with powers to make laws for the management of the trade, and to punish any persons who should offend against their provisions. For further encouragement, a lottery was granted for three years; a collection was made in churches; and an exemption granted for seven years from customs, both inwards and outwards, on the sale of fish exported to the Baltic, Denmark, Norway, France, and some other countries. Besides this, all victuallers and coffeehouse-keepers were compelled each to take a certain number of barrels of herrings yearly at 30*s.* per barrel, 'until a foreign market should be established to the satisfaction of the council.' Beyond these *encouragements*, a duty of 2*s.* 6*d.* per barrel was imposed upon foreign herrings imported; and a promise was made of 'all such other advantages as experience should discover to be necessary.' Great as were these encouragements, no progress was made in the fishery for sixteen years, at which time a charter was granted to a new fishing company, which raised by subscription 11,580*l.* This company, which was renewed in 1690, also failed, and was dissolved by act of parliament early in the reign of William III. Two further efforts, made in 1720 and 1750, were alike unsuccessful. Various reasons have been assigned for these repeated failures. Among these reasons may be mentioned, the rule which made London the head-quarters of the fishery, it being the dearest port in the kingdom, and the superiority of the Dutch in the art. Andrew Yarington, in the second part of 'England's Improvement by Sea and Land,' sums up all other reasons in this one fact—'We fish intolerably dear, and the Dutch exceedingly cheap.'

In 1749 a committee of the House of Commons was appointed to inquire concerning the herring and white fisheries, and as the result of its labours a corporation was formed, with a capital of 500,000*l.*, under the name of 'The Society of the Free British Fishery.' A bounty of 36*s.* per ton on all decked vessels of from 20 to 80 tons employed in fishing was granted for fourteen years. This bounty was increased in 1657 to 56*s.* per ton, but without producing an adequate return to the adventurers, and in 1759, by the 33rd Geo. II., a bounty of 80*s.* per ton was granted, besides 2*s.* 8*d.* per barrel upon all fish exported, and interest at the rate of 3 per cent. was secured to the subscribers, payable out of the Customs' revenue. The whole number of vessels entered on the Custom House books for the fisheries in consequence of this act was only eight. In

this year the whole buss fishery of Scotland, according to the statement of Adam Smith ('Wealth of Nations,' b. iv. c. v.), brought in only four barrels of 'Sea Sticks,' (herrings cured at sea) each of which, in bounties alone, cost the government 113*l.* 15*s.*, and each barrel of merchantable herrings cost 159*l.* 7*s.* 6*d.* The explanation of this fact is, that the bounty being given to the vessels and not to the fish, 'ships were equipped to catch the bounty and not the herrings.' By the 25th Geo. III. (1785-6) the tonnage bounty was reduced to 20*s.*, and a bounty of 4*s.* per barrel was given on the fish, limiting the whole payment to 30*s.* per ton, except when more than three barrels per ton were taken, in which case 1*s.* per barrel was given on the excess. On an average of ten years 54,394 barrels were taken annually, at a cost to the government of about 7*s.* 6*d.* per barrel.

In 1786 'The British Society for extending the Fisheries and improving the Sea Coasts of the Kingdom' was incorporated, and a joint-stock was subscribed 'for purchasing land and building thereon free towns, villages, and fishing-stations in the Highlands and Islands of Scotland.' This joint-stock was raised by the subscriptions of a few spirited individuals, who did not look for any profitable return. The members of the society were chiefly proprietors of estates, and their object was the improvement of their property. No dividend has yet been made upon the money expended by the corporation; but it is expected that the lands taken for fishing-towns, hamlets, and fishermen's allotments, with the harbours, stores, and other buildings which they have constructed, may yield a return in rent.

Another act was passed in 1808 for the regulation of the fisheries. The bounty was again raised to 60*s.* per ton on decked vessels of not less than 60 tons burthen, with an additional bounty of 20*s.* per ton for the first 30 vessels entered in the first year. Premiums amounting to 3000*l.* were also granted for boats of not less than 15 tons burthen. This act prescribed regulations for fishing, curing, inspecting and branding herrings, and a board of seven commissioners was appointed for administering the law. This act, which was at first passed for a limited time, was made perpetual in 1815 (55 Geo III., c. 94). The tonnage-bounty had in the mean time been extended to fishing-vessels of not less than 45 tons burthen. During the year 1814 only five vessels had been fitted out for the fishery from Yarmouth, and not one for the deep-sea fishery from any other port of Great Britain. For the inspection and branding of herrings the whole coast of Great Britain was divided into districts. In each of these officers were appointed to oversee the operations of the fishermen, and to prevent frauds in regard to the bounty. The principal regulations affecting the curing of herrings were borrowed from the practice of the Dutch fishermen. In 1817 a further boon was granted to the fishermen by allowing them the use of salt duty free; a peculiar advantage, which ceased in 1823 by the repeal of the duty on that article.

The impolicy of granting bounties on production, the effect of which is to tax the people of this country in order that foreign countries may be supplied with articles of consumption at prices below their actual cost, came at length to be seen and acknowledged. In 1821 the tonnage bounty of 60*s.* above-mentioned was repealed; the bounty of 4*s.* per barrel, which was paid up to the 5th of April, 1826, was thereafter reduced 1*s.* per barrel each succeeding year; so that in April, 1830, the bounty ceased altogether. That this alteration of the system has not been productive of any serious evil to the herring-fishery will appear from the following table prepared from the reports of the commissioners of the British fisheries, wherein are stated the number of barrels cured, branded, and exported in each of the years ending the 5th of April, from 1815 to 1837. The average annual number of barrels of herrings cured and exported respectively in the five years that preceded the alteration was 349,488 and 224,370. In the five years from 1826 to 1830, while the bounty was proceeding to its annihilation, the average numbers were 336,896 cured, and 208,944 exported; and in the five years ending the 5th of April, 1837, the average numbers were 396,910 barrels cured, and 222,848 exported.

Year ending 5th of April.	Cured. Barrels.	Branded. Barrels.	Exported. Barrels.
1815	160,139	83,376	141,303
1816	162,651	116,436	107,688
1817	192,343	140,018	138,628
1818	227,691	182,089	162,689
1819	340,894	270,022	227,162
1820	382,491	309,700	253,516
1821	442,195	363,872	294,805
1822	316,524	263,205	214,956
1823	248,869	203,110	170,445
1824	392,190	299,631	239,630
1825	347,665	270,844	202,016
1826	379,233	294,422	217,673
1827	288,495	223,606	166,406
1828	399,778	279,317	211,659
1829	355,979	234,827	205,875
1830	329,556	218,418	181,654
1831	439,370	237,085	264,903
1832	362,660	157,839	217,499
1833	416,964	168,259	220,684
1834	394,916	178,000	272,093
1835	277,317	85,079	158,805
1836	497,615	192,317	273,393
1837	397,737	114,192	189,265

The number of boats and of fishermen, and other persons employed in taking, gutting, curing, and packing cod and herrings in each of the six years to April, 1837, were as follows:—

Year.	Number of Boats.	Number of Fishermen.	Number of Coopers, Curers, &c.	Total Number employed.
1832	11,059	49,164	31,402	80,566
1833	11,008	48,181	33,274	81,455
1834	11,284	49,212	33,054	82,266
1835	11,359	49,462	32,861	82,323
1836	11,427	49,720	37,178	86,898
1837	11,494	51,907	34,626	86,533

The impolicy of the bounty system has been placed in a very striking light by the evidence of Mr. Ternan, of Liverpool, a factor for the sale of fish. The fishermen of that part of the coast are mostly inhabitants of a village on the coast called Skerries, where the houses are neater and in better repair now than they were during the time of bounties, and the men themselves are 'better clothed, better fed, more industrious, and more temperate than they were during the bounty. Nothing was more calculated to demoralise them than the bounties, as they were given: nothing could have been more mischievous or more injudicious than the tonnage-bounty system; it was, in fact, a bounty on idleness and perjury. Their increased prosperity has arisen from their astonishingly increased industry, and their greater reliance on their own exertions, without looking to extraneous aid.' In Scotland the fishermen have been able, from the profits of their business since the removal of the bounty, to replace the small boats they formerly used by new boats of larger dimensions, and to provide themselves with fishing materials of superior value.

A select committee of the House of Commons was appointed in 1833 to inquire into the state of the British Channel fisheries. A second committee was appointed in 1836 to consider the state of the salmon fisheries in Scotland, and in the previous year commissioners had been instructed to investigate the condition of the Irish fisheries. From each of these bodies reports have proceeded which have been laid before parliament and contain a considerable amount of information upon the subject.

Taking these branches of the inquiry in the order here given, we proceed to describe, as briefly as possible, the actual condition of the fisheries connected with the coasts and rivers of the United Kingdom. The appointment of the committee in 1833 arose out of the distress which was at that time said to affect the several Channel fisheries, and in its report the committee stated that these fisheries were generally in a very depressed and declining state; that they appear to have been gradually sinking since the peace in 1815; that the capital employed does not yield a profitable return; that the number of vessels and of the people to whom it gave employment is diminished; and that the fishermen who formerly could maintain themselves and their families by their industry were in a greater or less degree pauperised.

The cause of this unfavourable change, to which, as being in its opinion the most readily susceptible of remedy, the committee gave its principal attention, was the interference of the fishermen of France and Holland; but the principal cause of the distress was stated to be 'the great and in-

creasing scarcity of all fish which breed in the Channel, compared with what was the ordinary supply 15 to 20 years ago, operating prejudicially to the fishermen, at the same time that a continued fall of prices has taken place in the markets.' This fall of prices could not have occurred in consequence of any scarcity in the supply. That there was a diminished quantity taken by the English fishermen may possibly have been true; but considering that the supply in our markets was actually increased so as to provide our growing population at progressively decreasing prices, we can only account for the facts adduced by the committee by supposing that the foreign fishermen, of whose interference such grievous complaint was made, were better skilled and more persevering in their calling than our own countrymen a supposition which seems to be borne out by the circumstance of our having, since this report was delivered, been still more abundantly supplied with fish for our tables; while the cry of distress on the part of the fishermen has passed away, doubtless owing to the greater degree of skill and industry which they have since exerted.

A complaint, the opposite to that brought forward by the committee, has of late been preferred against our fishermen by the owners of the boats, who allege that, having advanced all the capital necessary for the undertaking, and having probably also contributed to the support of the men during the dead season, under the faith of an agreement to receive at stipulated prices all the produce of their nets, the men so bound to them sell a considerable part of the fish which they take to boats despatched from the coast of France. These circumstances have been mentioned, because a great and it is thought a groundless impression was created by the result of the inquiry of 1833, which inquiry, it has been alleged, was undertaken to satisfy the desires of certain interested parties who wished to make out a case for the interference of government.

One branch of fishing wholly different in its object from all other branches has been described by the committee of 1833 under the title of the *Stow-Boat Fishery*. This fishery prevails principally upon the Kentish, Norfolk, and Essex coasts; and the object is the catching of sprats, not for food, but as manure for the land, for which there is a constant demand. This branch of fishing is represented by the committee to have much increased, and to give employment on the Kentish coast alone to from 400 to 500 boats, which remain upon the fishing grounds frequently for a week together and until each has obtained a full cargo of dead fish.

The facility which the pretence of employing vessels in fishing gives to the operations of smugglers has led to an act of parliament, 6 Geo. IV., c. 108, under which vessels and boats of certain descriptions are required to be licensed by the commissioners of the customs. The licenses thus granted specify the limits beyond which fishing-vessels must not be employed: this distance is usually four leagues from the English coast, and it is affirmed that our fishermen are injured by this restriction, because some valuable fishing grounds lie beyond the prescribed limits and are thus abandoned to foreigners.

The *pilchard fishery*, which is carried on upon parts of the Devon and Cornish coasts, is of some importance. The number of boats engaged in it is about 1000, which give employment to about 3,500 men at sea and about 5000 men and women on shore. The pilchards visit our shores in August and September, and again in November or December: they come in large shoals into shallow water. As soon as caught they are salted or pickled and exported to foreign markets, chiefly to the Mediterranean: the average export amounts to 30,000 hogsheads per year. The quantity was much greater formerly, when a bounty of 8*s*. 6*d*. per hogshead was paid upon all exported. This bounty has now ceased, and as additional reasons for the diminution of the fishery, it is said that Lent is not now so strictly observed as formerly in the countries to which the exports are made, and that the heavy duty, equal to 18*s*. per hogshead, imposed upon importation into Naples, which has long been the principal market, has checked consumption.

The extent of the British *herring-fishery* has already been noticed. The places where it is principally carried on are Yarmouth, Lowestoff, Hastings, Folkestone, Cardigan Bay, and Swansea, in England and Wales; the coasts of Caithness, Sutherland, Aberdeenshire, Banffshire, Murrayshire, and Ross-shire, in Scotland; and Galway, Killybegs on the coast of Donegal, Mayo, the estuary of the Shannon, the coast between Dingle Bay and Kenmare, Bantry Bay, Waterford, and from Mizen-head to Cahore point on the Wicklow coast, in Ireland.

The following table, constructed from the reports of the late commissioners of the Irish fisheries, shows the number of boats and men employed, and the produce of *cured* fish in each year from 1821 to 1829.

Years.	Number of Boats.	Number of Fishermen.	Barrels of Herrings cured.	Cwts. of Cod, Ling, Hake, Haddock, &c.	Barrels of Herrings exported.	Cwts. of other Fish exported.
1821	7,655	36,159	9,726	22,689	400	434
1822	9,304	44,892	12,258	28,314	1,589	72
1823	10,399	49,448	27,857	31,424	4,511	197
1824	10,882	52,482	41,633	24,886	1,693	269
1825	10,823	57,809	41,376	34,833	209	..
1826	12,02[illegible]	58,044	26,698	33,821	..	..
1827	12,126	59,321	15,784	40,807	693	690
1828	12,611	63,421	13,513	39,750	..	..
1829	13,119	64,771	16,855	60,380	18	185
1836	10,761	54,119				

The principal herring-fishery off the coast of Norfolk and Suffolk commences in September and ends in the beginning of December. Mackerel fishing begins 1st May and ends 1st July. No material changes have occurred in the seasons, but herrings are more numerous of late years on the Yorkshire coast. For both fisheries decked-vessels of 30 to 60 tons register are generally used.

Our chief salmon-fisheries are carried on in the rivers and estuaries of Scotland. As no bounty has been at any time payable upon the taking or exporting of this kind of fish, it has been difficult to ascertain its actual or comparative amount. Some partial returns have been obtained from persons who have rented the different fishing grounds, but these do not offer a complete view of the fishery, and its produce being consumed within the kingdom, the custom-house, which takes no note of goods conveyed from port to port, affords no help towards supplying the deficiency. A detailed account has been given of the produce of the salmon-fisheries in the rivers on the coast of Sutherland, from which the following table, giving the produce for three years to 1835, has been taken:—

		1833.	1834.	1835.
River Shin	lbs.	45,639	79,025	63,081
,, Brora		23,467	40,351	40,343
,, Helmsdale		33,782	24,199	30,140
,, Naver and Borgie		28,134	54,112	57,412
,, Hope		10,966	29,962	25,343
,, Grudy		1,163	12,314	13,207
,, Inchard		1,643	2,965	4,750
,, Laxford		9,135	17,456	24,015
		153,929	260,384	258,291

The produce of the salmon-fisheries in some other of the rivers of Scotland, during each of the same three years, was as follows:—

		1833.	1834.	1835.
River Foyle	lbs.	292,947	304,166	321,366
,, Beauly	No. of fish	8,894	15,227	15,891
,, South Esk and North Esk	No. of fish	29,096	42,205	54,659

The average weight of the fish may be estimated at 10 pounds.

The produce of the fishings in the rivers Tay, Dee, Don, Spey, Findhorn, Beauly, Borriedale, Langwell and Thurso, and of the coasts adjacent, are conveyed in steam-boats and small sailing vessels to Aberdeen, where they are packed with ice in boxes and sent to the London market. The shipments thus made from Aberdeen, in each of the three years ending with 1835, were as follow:—

	Boxes.	Kits.
1833	10,449	4,527
1834	8,676	4,079
1835	11,549	5,671

Each box contains on the average from 10 to 12 fish and weighs 120 lbs. A statement, which does not however appear to be entitled to much confidence, has been given of the quantity of salmon brought by sea to London from Scotland and Ireland in each of the years 1834 and 1835, viz.—

1834	18,254 cwt.
1835	20,557 ,,

The most productive salmon-fisheries in Ireland are

situated near the mouths of the rivers; the most important are the following:—

- The Boyne with its tributaries, the Mattock and Blackwater.
- The Glenarm, the Main and the Glenariff, in Antrim.
- The Bush with its tributaries, the Pound, Burn Gashet, and Dervock.
- The Bann with its tributaries, the Roe, the Agivey, the Claudy, the Ballinderry, the Blackwater, the Upper Bann, and the Milltown.
- The Foyle with its tributaries, the Roe, the Faughan, the Dermot, the Mourne, the Derg, the Mourneheg, the Killinburn, the Strule, and Cammon.
- The Lennon or Rathmelton which joins Lough Swilly.
- The Lackagh with its tributaries, the Owencary and the Clune.
- The Ballynass and the Raye.
- The Esk or Donegal river, with its tributary the Driminy.
- The Erne.
- The Newport and its tributaries, the Skudagh, Buckadoon, Glenisland, and Beltra.
- The Moy and Ballycroy.
- The Boyle and its tributaries, the Bella and Lung.
- The Owenmore, the Gowla, the Galway.
- The Shannon with its tributaries, the Fergus, the Maig, and the Annacotty.
- The Laune and Maine, the Kenmare and the Currane.
- The Middleton and its tributaries, the Ballinasloe, the Lisgoold, the Gurtacrue, and Dungouney.
- The Ilenn and Bandon.
- The Blackwater and its tributaries, the Owbeg, the Funcheon, and the Annaglin.
- The Suir, the Barrow, and the Nore.
- The Bray and its tributaries, the Enniskerry, Powerscourt and Glencree, and the Liffey.

Mackerel are fish of passage which visit every part of our coasts in the spring and early part of the summer, and are taken in great abundance. In this country they are used fresh, and great quantities are conveyed by rapid land journeys from the coast to London. For the encouragement of the mackerel and other similar fisheries, the carriages in which the fish are thus conveyed are exempted from the post-horse duty. The general desire to obtain this fish in perfection has led to the well-known relaxation of our laws against Sunday trading, which permits the open hawking about of mackerel on that day, a practice which is punishable with regard to any other fish, or indeed to articles of any kind, with the exception of milk. The fishing-boats on those parts of the coast which are sufficiently near to the Thames are accompanied by fast-sailing cutters, which collect the takings of the fishing-boats and proceed with the cargo to Billingsgate market while the boats pursue their occupation. During a favourable season 100,000 mackerel are brought to Billingsgate market every week. Those fish which, as described, are brought by land conveyance to London are sold at a kind of auction on the beach by the fishermen to the owners of the carts or vans, whose success in the speculation depends mainly upon their quickness in bringing them to the market for consumption.

The principal fisheries on the eastern coast of England are in the neighbourhood of Whitby, Hartlepool, and Robin Hood's Bay. The fish-markets of Liverpool and Manchester, and, since the opening of the Grand Junction Railway, that of Birmingham also, are generally well supplied by land carriage with fresh fish, both round and flat, from those fishing grounds. A good deal of fish likewise comes to that port by steam-vessels from the Isle of Man.

The demand for fresh fish in the west of England is said to be extensive and increasing. In the season of 1835, according to the Report of the Commissioners, probably 12,000,000 of pilchards were sold for home consumption, besides a large supply of mackerel, hake, &c., fresh and salted. The fish is distributed throughout the country in carts and on horses. Pilchards are often sold at 1*s.* to 1*s.* 6*d.*, and herrings at 2*s.* per 126; cod-fish at 2*s.* each; red mullets 2*d.* to 6*d.* each; turbots 2*d.* to 6*d.* per lb.; mackerel 1*d.* to 3*d.* each.

The different fishing grounds of Scotland and Ireland, and the kinds of fish found most abundantly at each, are as follow:—

SCOTLAND.

Leith.—Herrings, cod, ling, haddock.

Burntisland.—Herrings.

Stonehaven.—Herrings, haddocks halibut, cod, ling, skate, mackerel.

Collieston.—Herrings, haddocks, cod, mussels (inhabitants all fishermen).

Peterhead.—Herrings, cod, haddocks.

Port Gordon.—Herrings.

Findhorn.—Herrings, cod, haddocks.

Cromarty.—Herrings, lobsters.

Caithness.—Herrings.

Wick.—Herrings, cod, ling, hake, salmon, haddock flounders.

Thurso.—Herrings.

Tongue.—Herrings.

Ullapool.—Herrings.

Loch Carron.—Herrings, cod, ling, hake

Inverary.—Herrings, cod, ling, salmon

Greenock.—Herrings, cod, ling.

Rothsay.—Herrings.

Campbelton.—Herrings, turbot, sole, flounders.

Orkneys.—Herrings, cod.

Shetland Isles.—Herrings, cod, ling.

Stornaway.—Herrings, cod, ling.

IRELAND.

Coast of Dublin.—Cod, haddock, whiting, herrings trout, salmon.

Louth.—Cod, haddock, conger, ling, mackerel, whiting herrings, hake, and flat-fish.

Down.—Cod, haddock, ling, whiting, conger, turbot soles, plaice, brill, mackerel, herrings (200 boats), mullet

Antrim.—Cod, ling, conger, pollock, flat-fish, turbot, haddock.

Donegal.—Soles, plaice, oysters, herrings, turbot, cod, ling, eels, haddock, dorees, hake, whiting, conger, mackerel, sprat, glassen.

Sligo.—Turbot, cod, and all kinds of fish that frequent the Irish coast.

Mayo.—Turbot, sole, cod, ling, haddock, hake, whiting, glassen, conger, gurnet, pollock, mackerel, herrings, skate, sprat, bream.

Galway.—Cod, ling, pollock, mackerel, bream, herrings, conger, sun-fish, haddock, gurnet, whiting, hake, turbot, glassen, soles, plaice, doree, halibut.

Clare.—Turbot, cod, ling, haddock, hake, soles, whiting, gurnet, mackerel, thornback, doree, ray, skad.

Kerry.—Turbot, haddock, gurnet, pollock, plaice, sole, doree, cod, whiting, ray, conger, mullet, mackerel, shad, bream, herrings, pilchards, hake, ling, glassen.

Cork.—Turbot, sole, cod, ling, haddock, mackerel, conger, hake, whiting, shad, pilchards, herrings, plaice, pollock, halibut, doree, skate.

Waterford.—Cod, ling, hake, haddock, glassen, herrings.

Wexford.—Cod, ling, hake, gurnet, whiting, pollock, turbot, mackerel, herrings, pilchards, lobsters, conger, bream, soles, plaice.

Wicklow.—Herrings, cod, oysters, ling, haddock, whiting, mackerel, soles, plaice, pollock, trout, salmon.

Cod.—The cod fishery at Newfoundland was carried on as early as 1500 by the Portuguese, Biscayans, and French, but it was not until 1585 that the English ventured to interfere with them. In that year Sir Francis Drake being sent to the island with a squadron, seized the foreign ships which he found engaged in the fishery, and sent them to England, where they were declared lawful prizes. Seven years before that time attempts had been made to settle a colony upon Newfoundland under a charter granted by Queen Elizabeth, but without success. In 1610 a company was incorporated for the same purpose by King James I., and so successfully was the fishery prosecuted, that in 1614 there were near 200 vessels engaged in it: in the following year the number exceeded 250. The author of 'Considerations on the Trade to Newfoundland,' inserted in the second volume of Churchill's 'Collection of Voyages,' tells us that 'towards the end of the seventeenth century the French were in the habit of employing in these fisheries about 500 sail of ships, a great many of which were of good burthen, and mounted from sixteen to forty guns, to man which they have by a moderate computation about 16,000 men.' This writer adds, that 'the French by their extraordinary frugality, joined with their other great advantages, such as the cheapness of salt, and having the best and most convenient part of the country for fishing, have quite beaten the English

out of this trade, as may be instanced in many of the outports of our nation, and particularly Barnstaple and Bideford, which formerly employed in this trade above fifty ships, and now do not fit out above six or eight small ships.'

By the treaty of Utrecht, which acknowledged the sovereignty of the whole island of Newfoundland to be in the crown of England, the privilege of fishing on part of the coast was reserved to France, notwithstanding which the English fishery there increased to a great extent. In 1763 there were taken and cured by the English at the fisheries of Newfoundland 386,274 quintals or hundred-weights of cod-fish, and 694 tierces of salmon, besides 1598 tons of fish oil. In that year there were 106 vessels employed in carrying on the fishery, 123 ships for conveying the fish when cured to England, and 142 ships for its conveyance to British colonies. The principal fisheries of Newfoundland are prosecuted on the Banks which nearly surround that island: the object of these fisheries is solely cod-fish. [NEWFOUNDLAND.] Salmon, mackerel, herrings, and some other kinds of fish, are taken off the coasts of the island; and the seal fishery is carried on successfully, yielding a considerable number of seal-skins and a large quantity of seal-oil for exportation.

The cod-fish cured and exported to England and to foreign countries in 1785 amounted to 591,276 quintals; and the subsequent success of the fishery will be seen from the following account of its produce exported in each of the three years from 1832 to 1834:—

		1832.	1833.	1834.
Cod-fish, dry	quintals	619,177	883,536	763,187
„ wet	barrels	858	3,633	2
Herrings	boxes	86		
	barrels	1,728	3 039	1,823
Mackerel	„	477	326	202
Salmon	„	2,690	3,256	3,363
Seal skins	number	442,003	384,699	315,241
Train-oil	gallons	2,522,508	2,860,988	2,297,618
Total value		£583,687	£699,174	£619,085

The total produce of the fisheries in these three years, exclusive of the oil, was valued as follows:—

1832	£458,662
1833	594,429
1834	485,926

These fisheries may be said to be the sole pursuit of the settlers in Newfoundland, and of the traders who frequent the island. Nearly every family has a small piece of land under garden cultivation, but agriculture is not pursued as a substantive occupation.

In the other British North American colonies, with the exception of Upper Canada, fisheries are established, and the produce enters more or less into their foreign commerce. The kinds of fish exported are chiefly cod, herrings, salmon, and mackerel. The actual value of these exports from each colony, in the three years 1832 to 1834, was as follows:—

	1832.	1833.	1834.
Lower Canada	£6,475	£4,680	£6,492
New Brunswick	31,885	34,789	35,973
Nova Scotia	155,189	162,195	143 712
Prince Edward's Island	65	11	89
Cape Breton	10,383	11,963	11,470
Total	£203,997	£213,638	£197,736

Whales.—The whale fishery was carried on successfully during the twelfth, thirteenth, and fourteenth centuries by the Biscayans. The whales taken by them in the Bay of Biscay appear to have been of a smaller species than those since found in more northern latitudes. The Biscayan fishery has long ceased, owing probably to the great destruction of the animals. It is to the voyagers who, near the end of the sixteenth century, attempted to find a passage through the northern ocean to India, that we owe the discovery which led to the establishment of the fishery in the seas of Greenland and Spitzbergen. The English and the Dutch were the first to embark in this adventure, but the French, Danes, Hamburghers, and others were not slow to follow their example. At first the whales were so numerous that the fishing was comparatively easy, and was so successfully pursued, that in addition to the ships actually engaged in the fishery, many other vessels were sent in ballast to the shores of Spitzbergen, and the whole returned home with full cargoes of oil and whalebone. It was then the practice to boil the blubber on the spot, and bring home the oil in casks. In the progress of the fishery the whales became less numerous, and, when found, more difficult to take. It therefore became necessary to pursue them farther to the open sea, and at length it was found more economical to bring the blubber home in order to its being boiled, and the settlements before used for that purpose were abandoned.

That part of the Arctic Sea which lies between Spitzbergen and Greenland, and which was formerly frequented by the whale ships, is now almost wholly abandoned because of the scarcity of the fish, and the northern whale fishery is now chiefly pursued in Davis's Straits. The change here noticed has occurred within the last twenty years, as appears from the following statement of ships which arrived from the northern fishery in each year from 1815 to 1834, distinguishing between those from Greenland and those from Davis's Straits. In this table will also be found the aggregate tonnage of the ships and the number of tuns of oil and tons of whalebone imported.

Years.	Number of Ships from Greenland.	Number of Ships from Davis's Straits.	Total Number of Ships.	Total Tonnage.	Number of Whales taken.	Tuns of Oil.	Tons of Whalebone.	Tuns of Oil to each Ship.	Tuns of Oil to each Whale.	Number of Ships lost in each Season.
1815	98	48	146	47,148	733	10,682	528	73	14¼	1
1816	101	45	146	46,868	1,330	13,590	632	93	10	1
1817	97	53	150	48,084	828	10,871	539	72¼	13¼	5
1818	94	63	157	50,362	1,208	14,482	666	92¼	12	2
1819	96	63	159	51,082	988	11,401	517	71¼	11¼	12
1820	102	57	159	50,546	1,595	18,745	946	118	11¾	3
1821	80	79	159	50,709	1,405	16,853	923	106¼	11¾	11
1822	61	60	121	38,144	630	8,663	422	71¼	13¾	8
1823	55	62	117	36,759	2,018	17,074	921	146	8¼	3
1824	32	79	111	35,013	761	9,871	534	89	13	1
1825	21	89	110	34,751	500	6,370	350	58	12¾	5
1826	5	90	95	30,414	512	7,200	400	75¾	14	5
1827	16	72	88	28,273	1,162	13,186	733	149¾	11¼	1
1828	14	79	93	28,665	1,197	13,966	802	150	11¼	3
1829	1	88	89	28,812	871	10,672	608	120	12¼	4
1830	—	91	91	29,396	161	2,199	119	24	11¾	19
1831	8	80	88	28,608	451	5,104	273	58	11¼	3
1832	19	62	81	26,393	1,563	12,610	676	155¼	8	5
1833	3	74	77	25,294	1,695	14,508	802	188¼	8½	1
1834	7	69	76	24,955	872	8,214	442	108	9¼	3

It appears from the foregoing table that the average results of the Greenland and Davis's Straits fishery, computed from twenty years' experience, are as follows:—

Number of ships returned to Great Britain	115¾
Tonnage of ditto	37,013¾
Number of ships lost	5
Tuns of train oil	11,313
Tons of whalebone	591¾
Number of whales taken	1,024
Tuns of oil yielded by each whale	11½
Tuns of oil procured by each ship	101¼

The average prices during the twenty years embraced in this table were—of oil, 28*l.* 15*s.* per tun, and of whalebone, 163*l.* per ton; it follows therefore that the annual average produce of the fishery has amounted to 421,704*l.*

The proportions in which the different ports of the kingdom participate in this fishery is shown by the following statement, applying to the year 1834.

Ports.	Number of Ships.	Tonnage.	Number of Whales.	Tuns of Oil.	Tons of Whalebone.
Hull	27	8,906	273	2,696	146 10 c.
Whitby	2	723	16	145	8 0
Newcastle	3	1,131	25	283	17 4
Berwick	1	310	34	220	11 3
London	3	953	22	177	9 10
Burntisland	2	688	25	177	9 10
Peterhead	11	3,076	99	1,093	57 15
Aberdeen	6	1,979	72	801	45 9
Dundee	8	2,789	115	1,036	53 10
Montrose	3	962	20	144	7 17
Kirkaldy	5	1,591	92	743	38 6
Leith	5	1,847	79	699	37 4
Total	76	24,955	872	8,214	441 18

Previous to the revolt of the North American provinces this fishery, as well as that in the Southern Ocean, was prosecuted with great spirit by the colonists of Massachussetts. Just before the beginning of the war they employed annually 183 ships of 13,820 tons in the Northern, and 121 ships of 14,026 tons in the Southern whale fisheries. This display of enterprize on the part of the colonists was thus

noticed by Burke in a speech delivered by him in the House of Commons in 1774:—'As to the wealth which the colonists have drawn from the sea by their fisheries, you had all that matter fully opened at your bar. You surely thought these acquisitions of value, for they seemed to excite your envy; and yet the spirit by which that enterprising employment has been exercised ought rather, in my opinion, to have raised esteem and admiration. And pray, sir, what in the world is equal to it? Pass by the other parts, and look at the manner in which the New England people carry on the whale fishery. While we follow them among the trembling mountains of ice, and behold them penetrating into the deepest frozen recesses of Hudson's Bay and Davis's Straits; while we are looking for them beneath the Arctic circle, we hear that they have pierced into the opposite region of polar cold; that they are at the antipodes, and engaged under the frozen serpent of the south. Falkland Island, which seemed too remote and too romantic an object for the grasp of national ambition, is but a stage and resting-place for their victorious industry. Nor is the equinoctial heat more discouraging to them than the accumulated winter of both poles. We learn that while some of them draw the line or strike the harpoon on the coast of Africa, others run the longitude and pursue their gigantic game along the coast of Brazil. No sea but what is vexed with their fisheries—no climate that is not witness of their toils. Neither the perseverance of Holland, nor the activity of France, nor the dexterous and firm sagacity of English enterprize ever carried this most perilous mode of hardy industry to the extent to which it has been pursued by this recent people; a people who are still in the gristle and not hardened into manhood.'

It was not until after the breaking out of war between England and the American provinces had, for a time at least, interrupted this spirit of enterprize, that England embarked in the Southern fishery. Towards the close of the last century the number of English vessels so employed was considerable; in 1791 they amounted to 75; but the fishery has not always been maintained on so large a scale. It requires a considerable sum of money to fit out a ship. A new vessel of the size usually employed—350 tons—costs, when ready for sea and fully provisioned, from 12,000*l.* to 15,000*l.*; and the adventurer must wait three years for the return of his capital.

From the manner in which the Custom-house accounts are given, it is not possible to state from them the produce of this branch of the whale fishery. The following account of the importations of Southern oil during 13 years, from 1820 to 1832, was delivered in 1833 to a committee of the House of Commons by a gentleman who, of all our merchants, is the most largely engaged in the business:—

Years.	Spermaceti Oil.			Black Whale Oil.		Total.
	British Fishery.	New South Wales.	United States.	British Fishery.	Colonial Fishery.	
	Tuns.	Tuns.	Tuns.	Tuns.	Tuns.	Tuns.
1820	2264	none.	147	[illegible]	none.	7472
1821	3005	..	..	[illegible]	117	6470
1822	5009	..	..	1008	634	6651
1823	5743	247	..	1444	557	7991
1824	4940	125	..	619	515	6199
1825	3609	54	..	920	344	4927
1826	5695	388	..	454	289	6826
1827	4476	834	528	665	474	6477
1828	3216	116	399	136	338	4205
1829	4605	818	255	102	478	6258
1830	4157	498	137	419	904	6115
1831	5939	1576	90	192	1462	9259
1832	5578	1589	..	402	1783	9352

FISHGUARD. [PEMBROKESHIRE.]

FISSIROSTRES, the swallow tribe of birds, distinguished by a very broad bill with a very wide gape, and small and feeble feet. They belong to the order *Insessores*, or *Perchers*, and take their food on the wing. [HIRUNDINIDÆ; GOATSUCKERS; INSESSORES.]

FISSURELLA. [CERVICOBRANCHIATA, vol. vi. p. 443.]

FI'STULA LACRYMA'LIS. [LACRYMAL ORGANS, DISEASES OF.]

FISTULA'NA. [TUBICOLIDÆ; CLAVAGELLA, vol. vii. p. 241.]

FIT. [SYNCOPE.]

FITZJAMES. [BERWICK, DUKE OF.]

FITZSTEPHEN, WILLIAM, author of the earliest description of London extant, was of Norman extraction, but born in the metropolis. He became a monk of Canterbury, and was much connected with Archbishop Becket; he was one of his clerks, and an inmate in his family, filling different offices at different times in his train and household. He was also an eye-witness of the archbishop's murder at Canterbury, and continued with him after his other clerks and servants had deserted him. Fitzstephen is supposed to have died in 1191. His 'Description of the City of London' was part of another work, 'The Life and Passion of Archbishop Becket.' Dr. Pegge fixes the time of the composition of this work between the years 1170 and 1182: and adds, that we may challenge any nation in Europe to produce an account of its capital, or any other of its great cities, at so remote a period as the 12th century. It was accordingly noticed by Leland and Stow, the latter of whom inserted a translation of it in his 'Survey of London.' Dr. Pegge, in 1772, published Fitzstephen's original text, with a more accurate translation and notes. This is the best edition. Fitzstephen, if we may judge from his quotations, was well versed in the Latin, and had looked into some of the Greek classics. (Fitzstephen's *Descr. of Lond.* newly translated, &c., by an Antiquary (Dr. Sam. Pegge), 4to., Lond., 1772; Chalmers's *Biogr. Dict.*, vol. xiv. p. 342.) There is a fine uncollated MS. of Fitzstephen's history among the Lansdowne volumes in the British Museum, and a fragment of another copy among the manuscripts of the late Francis Douce, Esq., in the Bodleian.

FIU'ME, formerly St. Veit am Flaum (in the Illyrian language Raka or Reka), the chief town of the circle of the same name in the Austrian government of Trieste and kingdom of Illyria, is situated in a narrow valley at the efflux of the Fiumara into the gulf of Quarnaro in the Adriatic: 45° 20′ N. lat. and 14° 26′ E. long. The district, in the time of the Romans, formed part of Liburnia, and upon the partition of the empire became an appendage of the Eastern empire, from which it was wrested by Charlemagne in the reign of the Emperor Nicephorus. It was afterwards governed by its own dukes, one of whom, by name Chresmir, proclaimed himself king of Fiume about the year 900; and his posterity retained the title for more than a century afterwards. It subsequently became a fief of the patriarchs of Aquileia, then the property of the Valsee family, and was sold by them to Frederic III., emperor of Germany, in the year 1471. Fiume is well situated, and is composed of the old and new towns, in which there are altogether about 1050 houses and 9500 inhabitants. The new town lies next the sea, has a cheerful aspect, broad, handsome, and well paved streets, and a number of fine buildings, private as well as public; among the latter are the flesh, fish, and bread-markets, ranges of shops with colonnades, and the casino, a spacious structure, containing coffee-rooms, a hall for concerts, &c., and a theatre. The old castle, Festi Teriat, is situated on an adjacent height; and behind the new town is a steep rock on which the old town is built. The latter is a gloomy spot, laid out in steep narrow streets, and almost entirely inhabited by the lower classes. Here are the old chapter church of the Virgin's ascension, and the elegant church of St. Veit, built in imitation of the church of Santa Maria della Salute in Venice. The other buildings of note are a magnificent sugar refinery in freestone, a nunnery, a gymnasium and head-school, a lazaretto, the government offices, and a hospital. Fiume has manufactures of linens, leather, woollens, liqueurs, sugar, wax, tobacco, paper, &c. It has been a free port ever since the year 1722, but the extensive trade which it once carried on in timber, grain, oil, tallow, dried fish, colonial produce, &c. has much declined. A handsome promenade with avenues of plantain trees and public gardens are at one end of the new town; several stone jetties (*molos*) and a fine quay of freestone also embellish it.

FIXED AIR. [CARBONIC ACID.]

FLABELLA'RIA. [PSEUDOZOA.]

FLABELLI'NA. [NUDIBRANCHIATA.]

FLACCUS, CAIUS VALE'RIUS, was born at Padua according to some, or at Setia in Latium according to others, who ground their opinion chiefly on the names of Setinus Balbus, which are found added to his other names in some MSS. of the Argonautica. Some, however, have supposed that Setinus Balbus was merely a transcriber or reviser of the poem. Flaccus lived under Vespasian, and was a contemporary of Martial, who addressed to him one

of his epigrams, inviting him to abandon poetry for the bar, as a surer means of making his fortune. He seems to have died young at Padua; and Quinctilian speaks of his death as a loss to literature. He wrote his Argonautica in imitation of Apollonius. The poem is full of digressions and episodes, amidst which the main action languishes, and is often lost sight of. Some of the descriptions however are remarkably fine and poetical; and it is observed that Flaccus is more elegant in those parts of the poem which are of his own invention than in those which he has borrowed or imitated from Apollonius. His style is at times obscure, and he is very fond of displaying his erudition, which is often out of place. We have only eight books or cantos of his 'Argonautica,' the last of which is incomplete; the whole poem is supposed to have consisted of ten or twelve cantos. This poem was first discovered by Poggio Bracciolini in the convent of St. Gall. G. B. Pio published in 1519 an edition of it, adding the termination of the eighth canto as well as the ninth and tenth cantos of his own composition.

FLAG, the ensign or colours of a ship; from the Anglo-Saxon *fleogan*, to fly or float in the wind. Flags borne on the masts of vessels designate the country to which they respectively belong; and they are likewise made to denote the quality of the officer by whom the ship is commanded.

The supreme flag of Great Britain is the royal standard, which is only to be hoisted when the king or one of the royal family is on board the vessel: the second is that of the anchor on a red field, which characterizes the lord high admiral, or lords commissioners of the Admiralty: and the third is the union flag, in which the crosses of St. George, St. Andrew, and St. Patrick are blended. This flag is appropriated to the admiral of the fleet, who is the first naval officer under the lord high admiral. The Custom-house and the East India Company have distinguishing bearings in their respective flags.

In the British navy a fleet is divided into three squadrons—the centre, the van, and the rear; the centre being distinguished by red colours, the van by white, and the rear by blue, and respectively commanded by an admiral, a vice-admiral, and a rear-admiral. When the fleet is very large, there are three divisions in each squadron; and each squadron has then its admiral, vice-admiral, and rear admiral, who respectively hold the command of its centre, van, and rear divisions. The admirals are divided in like manner, there being an admiral, a vice-admiral, and a rear-admiral of the red squadron, and so of the white and blue squadrons; but in all cases an admiral carries his flag at the main, the vice-admiral at the fore, and the rear admiral at the mizen.

The three flags are plain red, white bearing the red cross of St. George, and plain blue; and the ensign worn by the ship that carries a flag, as well as by every ship belonging to the same squadron, is always of the same colour as that of the flag-officer commanding it.

FLAGELLANTS, FLAGELLATION. The idea of propitiating the Deity by self-torment dates from a remote antiquity. Herodotus relates (ii. 42) that the Egyptians flogged themselves at one of their annual celebrations. Flagellation was administered as a trial of fortitude to the young Lacedæmonians, who it seems, in accordance with the peculiar institutions of Lycurgus, did not attach to this castigation the idea of degradation which modern Europeans do. In Rome however the punishment of flagellation was only applied to slaves, and it seems to have been pretty common, as different classes of slaves derived their names from the kind of whips with which they were lashed. Some were called *Restiones*, because they were lashed only with cords; others *Bucedæ*, from being flogged with thongs of ox-leather. It is in reference to this custom that Plautus makes one of his personages say—'*Erunt Bucedæ inviti potius quam ego sim Restio.*' 'They shall be Bucedæ whether they will or no, before I be Restio.' The Jews employed flagellation as a punishment, but never as a voluntary act of devotional exercise. This practice was unknown to the primitive Christians; neither does it appear that the first hermits of the Thebaid added self-flagellation to the different modes of penance with which they tortured their body. The rules of the first monasteries in the East, drawn up by St. Anthony, Paphnutius, Macarius, and others, contain no ordinances as to that kind of discipline, neither is it mentioned in the original regulations of the Benedictine order, the first that was established in the West. The legends which describe the lives of the saints who lived before the beginning of the fifth century never speak of self-flagellation amongst the various torments which the above-mentioned saints inflicted on themselves, although they record frequent instances of the devil's venting his rage on those holy men by giving them a sound flogging. The first known instances of this kind of self-mortification occur about A.D. 400, and from that time they became continually more frequent till the year 1056, when Cardinal Peter Damian de Honestis promoted by all his influence the practice of self-flagellation, which the learned author of the 'Ecclesiastical Annals,' Cardinal Baronius, calls 'a laudable usage of the faithful.' Damian's efforts were attended with great success, and the chroniclers relate that persons of religious dispositions were seen everywhere armed with whips, thongs, and rods, lacerating their own skins in order to draw down on themselves the blessings of Heaven. This practice began to spread so widely that many of the less bigoted clergymen endeavoured to discountenance it, but unsuccessfully, and it became every day more prevalent among the besotted crowds of that dark age. About the year 1260 the intoxication was complete. People being no longer satisfied to practise similar mortifications in private, began to perform them in public on pretence of greater humiliation. Regular associations and fraternities were formed for that purpose; and the extravagancies which they committed were of such a nature that even the contemporary writers, although accustomed to such scenes, seem to have been struck with astonishment. Such at least was the case with the monk of St. Justina, the first author who gives a circumstantial account of these fanatics.

'When all Italy was sullied with crimes of every kind,' says the above-mentioned annalist, 'a certain sudden superstition hitherto unknown to the world first seized the inhabitants of Perugia, afterwards the Romans, and then almost all the inhabitants of Italy. To such a degree were they affected with the fear of God, that noble as well as ignoble persons, young and old, even children five years of age, would go naked about the streets with only their private parts covered, and without any sense of shame would walk thus in public, two and two, in the manner of a solemn procession. Every one of them held in his hand a scourge made of leather thongs, and with tears and groans they lashed themselves on their backs till the blood ran; all the time weeping and giving tokens of the same bitter affliction, as if they really had been spectators of the passion of our Saviour, imploring the forgiveness of God and of his holy mother, and praying that he who had been appeased by the repentance of so many sinners would not disdain theirs. And not only in the daytime but likewise during the night, hundreds, thousands, and ten thousands of those penitents, notwithstanding the rigour of the winter, ran about the streets and in churches with lighted wax candles in their hands, and preceded by priests who carried banners and crosses with them, and with humility prostrated themselves before the altars. The same scenes were exhibited in small towns and villages; so that the mountains and the fields seemed to resound with the voices of men crying to God.' The same annalist relates that music, songs, and every kind of merriment ceased, and that women vied with men in these devotions. This general superstition produced however some good effects.

'Then,' continues the same author, 'those who were at enmity with one another became friends. Usurers and robbers hastened to restore their ill-gotten riches to their right owners. Others who were contaminated with different crimes confessed them with humility, and renounced their vanities. Gaols were opened, prisoners were set free, and banished persons permitted to return to their native habitations.'

This sudden repentance was the effect of the terror inspired by the general belief that the end of the world was at hand. Such mental fever could not last very long, and indeed it seems to have soon subsided. But in the 14th century, when the imaginations of the people were excited by the terrible pestilence known under the appellation of the black death, which desolated all Europe during that century, the flagellation mania broke out with new fury. Not only all the scenes of the 13th century were re-enacted, but the excesses of fanaticism became even worse than before. The flagellants spread over all Europe, and a band of them reached London in the reign of Edward III. Their

number consisted of 120 men and women. Each day at an appointed hour they assembled, ranged themselves in two lines and paraded the streets scourging their naked shoulders and chanting a hymn. At a given signal, all with the exception of the last, threw themselves flat on the ground; and he who was last, as he passed by his companions, gave each a lash, and then also lay down. The others followed in succession till every individual in his turn had received a stroke from the whole brotherhood. The citizens of London gazed and marvelled, pitied, and commended; but they went no farther. Their faith was too weak, or their skins too delicate; and they allowed the strangers to monopolise all the merits of such a religious exercise. The missionaries did not make a single convert, and were obliged to return without any other success than the conviction of having done their duty to an unbelieving generation. (Lingard's *History of England*, vol. iii. c. 18; and Stow's *Annals*, p. 246, ed. of 1631.)

The purity of the first flagellants was not long preserved by their followers, and it was but natural that a fanatical rabble, who thought that self-torment was a sufficient atonement for all possible sins, should fall into great excesses. The flagellants were soon accused of many crimes; the celebrated Gerson attacked them in his writings, and Pope Clement VII. declared them heretics and thundered out anathemas against them. The flagellants were persecuted everywhere, and many of them were burnt as heretics. It was however with great difficulty that this sect was completely extirpated. For farther particulars about the flagellants see all the ecclesiastical histories; and also Jacques Boileau, *Histoire des Flagellans;* an English paraphrase of the same work appeared under the title 'Memorials of Human Superstition by one who is not a Doctor of the Sorbonne;' see also Muratori's *Antiquit. Ital. Medii Ævi*, &c.

FLA'GEOLET, a small pipe, or musical instrument, of the flute kind, played on by means of a mouth-piece, in the manner of the old English flute and pitch-pipe. Its compass is two octaves, from F, the first space in the treble cleff, to F in altissimo. The scale of the *Quadrille Flageolet* is rather more limited; and that of the *Patent octave Flageolet* is an octave higher than the ordinary instruments.

The Double Flageolet consists of two instruments, united by one mouth piece, producing, as its name indicates, double notes. The use of the Flageolet is now almost entirely confined to the ball-room; it is superseded by the Octave Flute, or *Flauto Piccolo*. [FLUTE.]

FLAMBOROUGH HEAD. [YORKSHIRE.]

FLAME is the combustion of gaseous or of volatilised fluid or solid matter. It is attended with great heat, and sometimes with the evolution of much light; but the temperature may be intense, when the light is feeble: this is the case with the flame of burning hydrogen gas, it being scarcely visible by day-light, though its heat is intense: the combustion of hydrogen is then an example of flame resulting from the chemical action between it and the oxygen of the air. As the quantity of solid matter contained in a given volume of this gas is small, the light which its flame yields is inconsiderable; but it is greatly increased by combining it with carbon, by which there are obtained two gases, namely, carburetted hydrogen, employed under the name of *gas light*, and olefiant gas. Now 100 cubic inches of hydrogen gas weigh 2·15 grains, but the same volume of carburetted hydrogen weighs 17·2 grains, and of olefiant gas 30·1 grains: the difference of weight shows that of the charcoal or carbon with which the hydrogen is combined, and thus it is that these gases give out more light than hydrogen, and in proportion to the charcoal which they contain.

In the burning of a candle, the wax or tallow being first rendered fluid by heat, rises in the wick, and although the wick supplies some hydrogen and carbon, by far the greater portion of these is yielded by the wax or tallow, which burn by the assistance of the oxygen of the air. The supply of hot vapour diminishes as it ascends, and eventually fails, and hence the flame of a candle gradually tapers to a point and then ceases.

Two opinions have been entertained as to the mode in which flame is produced and propagated. According to Sir H. Davy, the flame of combustible bodies 'must be considered as the combustion of an explosive mixture of inflammable gas or vapour and air; for it cannot be regarded as a mere combustion at the surface of contact of the inflammable matter; and the fact is proved by holding a taper or a piece of burning phosphorus within a large flame made by the combustion of alcohol; the flame of the candle or of the phosphorus will appear in the centre of the other flame, proving that there is oxygen even in its interior part.' (*On the Safety Lamp*, p. 45.)

In the opinion of Mr. Sym (*Annals of Phil.*, vol. viii. p. 321) 'the internal part of the flame is comparatively cool, the actual combustion being diffused over the surface, and concentrated at the apex.' Mr. Sym adduces many curious and important experiments in proof of his opinion; but the most decisive facts in its favour are those related by Mr. Davies (*Ann. Phil.*, vol. x. p. 447), and they appear fully to warrant the inference he has deduced from them, that the interior of flame will not support combustion, and that on account of its containing no oxygen.

A piece of phosphorus was placed upon a small wooden stand in a Wedgwood dish; spirit of wine was then poured into the dish in such a manner that it did not reach the phosphorus. The spirit of wine was lighted, and its flame completely enveloped the combustible body. In the course of a few seconds the phosphorus became fluid, and remained in that state upon the stand, and never in a single instance inflamed, until the alcohol was consumed or its flame extinguished, though in several instances the spirit of wine continued to burn for three or four minutes. The phosphorus always burst into a vigorous flame when the spirit of wine was extinguished. When the flame of the spirit of wine was blown upon, so that the edge of it came in contact with the phosphorus, the phosphorus immediately burst into a flame, but the flame was instantly extinguished and the boiling resumed, as soon as the flame of the alcohol was restored to its natural position.

Mr. Davies states also that a lighted wax taper, surrounded by alcohol, was extinguished when the alcohol was inflamed.

That flame is merely a thin film of white hot vapour, and that this combustion is entirely superficial, while inflammable matter is contained within which cannot burn for want of oxygen, is proved by inserting one end of a small hollow glass tube into the dark central portion of the flame of a large candle or of a gas light; the interior unburnt vapour or gas will escape through it, and may be lighted at the other end of the tube.

A most intense light, employed by Lieutenant Drummond in geodesical operations, is produced by passing a stream of oxygen gas directed through the flame of alcohol upon lime turned into the form of small balls. He found the light emitted by the lime when exposed to this intense heat to be 83 times the intensity of the brightest part of the flame of an argand burner of the best construction and supplied with the finest oil. Lime has since been used with the oxy-hydrogen blow-pipe for the illumination of the solar microscope. It appears that it is the vapour of the lime, raised to this high temperature, to which the intensity of the light is owing: this is shown by the roof of the lantern being covered with a sublimate of lime.

The brilliancy of flame is much diminished by various cooling processes: thus when a piece of glass is put over or into the flame of a candle, it becomes covered with charcoal in the state of soot, which the diminished heat of the flame is incapable of burning. This takes place to a much greater extent with oil and tallow than with alcohol; the latter containing less carbon and more hydrogen than the former, its carbon is not so readily deposited by cooling.

It is on the cooling power of the metals with regard to flame, and especially of wire-gauze, that the construction of the safety-lamp depends. [SAFETY-LAMP.] The uses to which flame is applied are numerous and highly important: it is employed for the purpose of giving heat in reverberatory furnaces and in the blow-pipe, and for that of yielding light in lamps and candles. It is to be observed that flame is produced by various other chemical processes, and by other means than the combustion of substances containing hydrogen and carbon, though they are the elements from which it is obtained for all the numerous purposes of common life and manufactures.

FLAMEN, FLA'MINES, one of the orders of priesthood in antient Rome, like the Salii, the Feciales, and others, instituted, according to tradition, by Numa Pompilius. The Flamines were each destined to the service of some particular deity; there was the Flamen Dialis, who was consecrated to the worship of Jupiter, and was the first in rank; the Flamen Martialis, who attended to the worship of Mars, &c. They enjoyed great consideration, and their wives, called Flaminicæ, attended the sacrifices and other sacred

ceremonies. The Flamines were distinguished by a peculiar pileus, or hat, of a conical shape, which was fastened under the chin. Their number, which was originally only three, was increased afterwards as new gods were introduced, and at last even the emperors, being deified after death, had a Flamen appointed for them. The Flamines were chosen both from among the patricians and the plebeians.

FLAMINGO, *Flammant* of the French, *Phœnicopterus* of the antients and moderns, a genus of birds whose natural position seems to be between the *Waders* (*Grallatores*) and the *Anatidæ*. The form approaches in some points to *Recurvirostra* [AVOSET] and *Platalea* (the Spoonbills), and in others comes nearest to the *Anserinæ* (Geese). C. L. Bonaparte places it in a family, *Hygrobatæ*, with *Recurvirostra* and *Platalea*, between his family *Pinnatipedes* (Phalaropes, &c.) on the one side and the *Anserinæ* on the other. Mr. Vigors, in his paper 'On the natural affinities that connect the orders and families of birds,' thus marks its position among the Grallatores: 'Intermediate between *Ardea* and *Ciconia* appear those forms which display so remarkable a dilatation of the bill, the *Cancroma* [BOAT-BILL] *Phœnicopterus*, and *Platalea* of Linnæus. The two last of these groups are equally distinguished by a greater development of the membrane that connects the toes than is observable in the other *Waders* which join them on each side; and in one of them, the Phœnicopterus, this character is carried so far to the extreme as to have occasioned some systematists to place the birds of this genus among the *Natatores* (swimmers). But the whole of the family have a membrane, more or less extensive, at the base of the toes; and if we compare the feet of the common *Ciconia alba* (Stork), of the *Platalea*, and the *Phœnicopterus* together, we shall see a gradual increase of this membrane in extent, until it reaches the extreme in the latter genus.' Mr. Swainson appears to be one of those who place the Flamingo among the swimmers. In his 'Natural History and Classification of Birds' (1836), he says, 'the Flamingo, which has the longest legs in the Natatorial order, is so good a walker that it only swims occasionally.' The close correspondence of many parts of the organization of the bird with the same parts in the *Anatidæ* will be remarked by the reader when he comes to the anatomical description hereinafter stated.

Generic Character.—Bill strong, higher than it is large, dentilated, conical towards the point, naked at the base; upper mandible suddenly bent, curved at its point on the lower mandible, which is larger than the upper. *Nostrils* longitudinal in the middle of the bill, pierced through and through near the dome of the upper *arête*, covered beneath by a membrane. *Feet* very long; three toes in front, hind toe very short, articulated high up on the tarsus; anterior toes united to the nails by a lunated membrane (membrane découpée). *Nails* short, flat. *Wings* moderate; first and second *quills* longest.

Temminck, whose generic character we have given, says that the Flamingoes live on the sea-beach or in marshes formed by salt lakes, where their food consists of testaceous mollusks, marine insects (crustaceans?), and the spawn of fish, which they collect by plunging their long neck into the water and turning the head upside down, so as to employ with greater advantage the bend of their bill. They join in large troops and live in societies. Their nest is made in the marshes, and consists of earth piled up, and upon this nest the birds sit astride, because their length of limb hinders them from incubating otherwise. Whether they are reposing or fishing, sentinels are appointed which keep a sort of guard. If anything alarms the védette he utters a trumpeting kind of cry, and the whole flock follow him into the air. They rarely take their repose in any other than open places; and it is asserted that their sense of smelling is so acute that they scent from afar the hunter and fire-arms. Their moult appears to be simple and ordinary, but the young birds differ much from their parents. The red or rosy plumage which covers the adult shows itself gradually, after many moults and a period of about four years. The females are less than the males, and the colours of the former want the purity which distinguish the latter; the young, at their departure from the nest, are white. The body of the Flamingo has hardly a greater covering of down than that of the other Waders, the Avosets alone excepted; and accordingly they do not swim habitually, like the latter birds, when they wish to go from one bank to another in deep water. The palmated feet of the Flamingoes appear to be given them to enable them to sustain themselves on the slimy bottoms of rivers and creeks into which they wade as far as their long legs will allow them, and to walk thereon. As they fly in flocks they make an angle like the *Geese*. In walking they often apply their upper mandible to the ground, and lean on it as a point of support.

M. Temminck positively asserts that the Flamingo of Europe and that spread over the warm climates of America are different. He states that he knows the plumage of the American Flamingo from its youth to its adult state, and declares that they are all different from the various states of the Flamingo of the antient continent. The orange-red which pervades the whole of the plumage of the American species when it has arrived at its complete state of development is sufficient to distinguish that bird from our European Flamingo, which is of a rose-colour, with wings of purple-red The young of the latter (*Phœnicopterus Antiquorum*) has the plumage whitish, covered with brown streaks (mèches), very distinctly marked and long, principally on the greater wing-coverts; the American Flamingo (*Phœnicopterus ruber*) is covered in its youth with a dull whitish-gray plumage. Three species then are recorded by M. Temminck.

1. *The Flamingo of the Antients, Phœnicopterus Antiquorum, Flammant Phœnicoptère*, of Buffon, the *Flammant* and *Flamingo* of old authors. Locality, south of Europe, Africa, and part of Asia.

2. *The American Flamingo, Phœnicopterus ruber, Red Flamingo* of Wilson. Locality, South, and part of North, America.

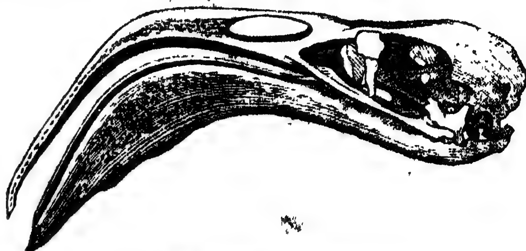
3. *Phœnicopterus minor, Flammant Pygmée*, previously described by Vieillot as *Phœnicopterus parvus*. Locality, South Africa.

M. Lesson observes that at all events it would be more convenient to retain the original name of Linnæus, *Phœnicopterus ruber*, for the Flamingo of the Old Continent, and to suffer that given by Molina to the American bird, viz., *Phœnicopterus Chilensis*, to remain, although Wilson, who does not appear to have recognized any specific difference, records the last-mentioned Flamingo under the name of *Phœnicopterus ruber*. The latter is used by most of the English zoologists to designate the Flamingo of the Old World, and we shall, adhering to the law of priority, and to prevent confusion, adopt the nomenclature suggested by M. Lesson, wishing, at the same time, that Molina's name had not been a name of locality.

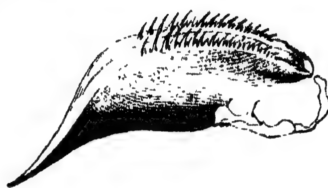
Before we enter into the history of these several species it will be advisable to inquire into the anatomical structure of the Flamingo, and Mr. Owen has enabled us to do this in his Notes on the Anatomy of the *Flamingo, Phœnicopterus ruber* of Linnæus, which died in the menagerie of the Zoological Society of London in the summer of 1832. After observing that the anatomical differences observable in the groups of the *Wading Birds* are so considerable, that we find them generally alluded to by Cuvier in the characters of the *Grallatores*, in the 'Règne Animal,' he remarks that, where they are omitted, we may presume that the illustrious author had not had the opportunity of examining the internal structure of the birds in question, and that they either had not before been dissected, or that their anatomy had been described with too little exactness to warrant his giving it on the authority of previous writers. This appears, in his opinion, to have been the case with the three genera which Cuvier has placed at the end of the order, viz., *Chionis*, Forster; *Glareola*, Gmel.; and *Phœnicopterus*, Linn.: and these, observes Mr. Owen, are the most interesting in an anatomical point of view, as being the representatives of as many distinct families. With respect to the Flamingo, Mr. Owen supposes that an opportunity of dissecting it had never occurred to Cuvier, and that probably the absence of any allusion to *cæca* in Perrault's anatomical description (*Mémoires de l'Académie*, t. iii., 3 P., p. 462) may have influenced Cuvier's silence regarding the internal structure of a bird which he considers as one of the most extraordinary and most isolated of its class. Cuvier, in allusion to the small tooth-like *laminæ* which are arranged along the margins of the upper mandible, points out the relation which the Flamingo bears, in this particular, to the *Anatidæ*; and Mr. Owen states that a like correspondence is observable in the rest of the alimentary canal. 'The horny denticles of the upper mandible,' writes Mr. Owen, 'and the transverse marginal furrows of the lower

mandible, form together a sort of filter, and, like the plates of *whalebone* in the *Balænæ*, allow the superfluous moisture to drain away, while the small *mollusca* and other littoral *animalculæ* are detained and swallowed. The structure of the gullet is in accordance with the size of the substances which serve for nutriment. In the typical *Grallatores*, as *Ardea* and *Ciconia*, which swallow entire fish and other food in large morsels, the *œsophagus* is remarkable for its great and uniform capacity; but in *Phœnicopterus* it is not more than half an inch in diameter when dilated. At the lower part of the neck it expands into a considerable pouch, which measured, in the specimen here described, 3 inches in diameter, and 4½ inches in length. In Perrault's specimen the diameter was only 1½ inch, and it was probably in a state of contraction, as he describes it as furnished internally with many small longitudinal *rugæ*. The circular fibres around this part were very distinct. Beyond this pouch the *œsophagus* again contracts to about 4 lines in diameter, and so continues for 3½ inches, when it terminates in the *proventriculus*. This glandular cavity was 1 inch 8 lines in length, and 5 lines in diameter: the gastric follicles were broad, short, and simple, and were arranged in two long oval groups, blending together at the edges. The *proventriculus* terminates in a small but strong gizzard, of a flattened spheroidal form, measuring 1 inch 5 lines in length, and the same in breadth; the lateral muscles were each half an inch in thickness. The gizzard was lined with a moderately thick and yellow-coloured cuticle, disposed in longitudinal ridges, the extremities of which projecting into the pyloric aperture form a kind of valve, as in the gizzard of the *Ostrich*. In a *Flamingo* dissected by Colonel Sykes, in which the *duodenum* was blocked up by two large *tape-worms*, the muscles of the gizzard were 1 inch in thickness. The duodenal fold extended towards the left side 4 inches from the *pylorus*. This intestine was 4 inches in diameter. The *pancreas*, which occupied its common situation between the two portions of the fold, had a more complete peritoneal covering than usual. The intestinal canal soon diminished in diameter to 3 and then to 2 lines. The small intestines formed an oval mass, and were disposed in twenty-one elliptical spiral convolutions, eleven descending towards the *rectum*, and ten returning towards the gizzard in the interspaces of the preceding; a disposition analogous to that of the *colon* in *Ruminants*. The *villi* of the intestines were arranged in longitudinal zigzag lines. There were two cæca, each about 3½ inches in length, and 5 inches in diameter. The *testes* were about the size of grains of wheat, and were situated on the anterior part of the renal capsules. The latter bodies were about the size of hazel-nuts. 'Both these glands were of a bright yellow colour. The fat of this bird is of a remarkable orange tint. The principal diseased appearances were in the lungs, which were filled with tubercles and *vomicæ*. I was much struck with finding the inner surface of the latter cavities, and that of most of the smaller ramifications of the branchial tubes, covered over with a green vegetable mould or *mucor*. As the individual was examined within twenty-four hours after its death, it seemed reasonable to conclude this *mucor* had grown there during the lifetime of the animal. Thus it would appear that internal parasites are not exclusively derived from the animal kingdom, but that there are *Entophyta* as well as *Entozoa*.'

'The tongue of the *Flamingo* is remarkable for its texture, magnitude, and peculiar armature. It is almost cylindrical, but slightly flattened above, and obliquely truncate anteriorly, so as to correspond with the form of the inferior mandible. The lower part of the truncated surface is produced in a pointed form, and is supported beneath by a small horny plate. The whole length of the tongue is 3 inches; its circumference 2½ inches. Along the middle of the flattened superior surface there is a moderately deep and wide longitudinal furrow, on either side of which there are from twenty to twenty-five recurved spines, but of a soft and yielding horny texture, measuring from one to three lines in length. These spines are arranged in an irregular alternate series, the outer ones being the smallest, and these, indeed, may be considered a distinct row. At the posterior part of the tongue there are two groups of smaller recumbent spines directed towards the *glottis*. The substance of the tongue is not muscular, but is chiefly composed of an abundant, yielding, cellular substance, with fat of an almost oily consistence. It is supported by a long and thin concave cartilage articulated to the body of the *os hyoïdes* by a shallow ginglymoïd joint allowing of a free motion. Excepting the straight *hyoglossi*, the muscles all terminate at the base of the tongue. The tendons of the former muscles run along the under part of the lingual cartilage, and expand to be inserted at its extremity, where a few fibres again proceed forwards to the extreme point of the tongue.' In the museum of the Royal College of Surgeons in London (Gallery) is a preparation, No. 524 E, of the crop, proventriculus, and gizzard of a *Flamingo*, *Phœnicopterus ruber* of Linnæus; and No. 1470 of the same museum is a preparation of the tongue of that bird.



Skull and mandibles of the Flamingo. From a specimen in the Royal College of Surgeons.



Tongue of Flamingo. From a specimen in the Royal College of Surgeons.

There were no *Entozoa* in the specimen dissected by Mr. Owen; but he characterizes the species found by Colonel Sykes, and above alluded to, as '*Tænia lamelligera*: length seven inches; breadth five lines; thickness one line. (*Zool. Proc.*, 1832, pp. 141 and 143.)

Species of the Old Continent.

Phœnicopterus ruber (Linn.); *Phœnicopterus Antiquorum* (Temm.).

Description.—Length from the end of the bill to that of the tail four feet two or three inches, but to the end of the claws sometimes more than six feet. Bill 4½ inches long; upper mandible very thin and flat, and somewhat moveable; the under mandible thick, both of them bending downwards from the middle: nostrils linear and placed in a blackish membrane; end of the bill as far as the bend black, from thence to the base reddish-yellow, round the base, quite to the eye, covered with a flesh-coloured cere; neck slender and of great length: tongue large, fleshy, filling the cavity of the bill, furnished with twelve or more hooked papillæ on each side, turning backwards; the tip a sharp cartilaginous substance. The bird when in full plumage wholly of a most deep scarlet, except the quills, which are black. From the base of the thigh to the claw thirty-two inches, of which the feathered part takes up no more than three; bare part above the knee thirteen inches, and from thence to the claws sixteen; colour of the bare parts red, and toes furnished with a web deeply indented. Legs not straight but slightly bent, the skin rather projecting. (Latham.)

Nest formed of earth, and in the shape of a hillock, with a cavity at top; eggs two or three, white, of the size of those of a goose, but more elongated.

Utility to man.—Flesh pretty good meat: the young thought by some equal to partridge. The inhabitants of Provence, however, are said to throw away the flesh as fishy and only to use the feathers as an ornament to other birds at particular entertainments. Not so the Roman epicures. Apicius has left receipts for dressing the whole bird with more than the minute accuracy of a modern cookery book, and the 'Phœnicopterus ingens' appears among the luxuries of the table in Juvenal's eleventh satire. The brains and the tongue figure as one of the favourite dishes of Heliogabalus, and the superior excellence of the latter was dwelt upon by the same Apicius and noticed by Pliny where he records the doctrine of that 'nepotum omnium altissimus gurges.' (Lib. x., c. 48.) Neither has it escaped the pointed pen of Martial—

> 'Dat mihi penna rubens nomen: sed lingua gulosis
> Nostra sapit: quid si garrula lingua foret? Lib. xiii.—lxxi.

The 'garrula lingua' most probably alludes to the tongues and brains of singing birds, which sometimes formed one of the monstrous dishes at the enormously expensive Roman entertainments. Dampier does not forget the delicious tongue of the Flamingo, observing that a dish of these tongues is worthy of a place at a prince's table. The bird itself seems to have been held in high repute by the antients, for it appears to have been one of the victims offered to Caligula,* who is said to have been sprinkled, while sacrificing, with the blood of a Phœnicopter the day before he was murdered.†



Phœnicopterus ruber.

Locality.—The European Flamingo is recorded as having been seen everywhere on the African coast and the adjacent islands quite to the Cape of Good Hope. There is a specimen in the South African Museum. Le Vaillant found thousands of Pelicans and Flamingos on the river Klein-Brak, where the water is brackish owing to the flowing of the tide. It has been occasionally observed on the coasts of Spain, of Italy, and on those of France which lie on the Mediterranean sea; it has been met with at Marseilles and some way up the Rhone. The prince of Musignano notes it as very rare and accidental in the neighbourhood of Rome. In some seasons it has been remarked at Aleppo and in the parts adjacent. It has been noticed on the Persian side of the Caspian Sea, and thence along the west coast as far as the Wolga, but at uncertain times, and chiefly in considerable flocks, coming from the north coast mostly in October and November. Col. Sykes records it in his catalogue of birds in the Dukhun (Deccan) as the *Rajah Huns* of the Hindoos. It breeds in the Cape de Verd islands. This species is very shy. Dampier killed fourteen at once by secreting himself and two more; they are not to be approached openly. Kolben speaks of their numbers at the Cape, where by day they resorted to the borders of lakes and rivers, and lodged at night in the long grass on the hills.

M. de la Mormora, in his voyage to Sardinia, gives the following interesting account of this species. It quits Sardinia about the end of March to return about the middle of August; then it is that from the bastion which forms the promenade of the inhabitants of Cagliari flights of these magnificent birds may be seen to arrive from Africa. Disposed in a triangular band, they show at first in the heavens like a line of fire. They advance in the most regular order, but, at the sight of the neighbouring lake, there is a pause in their progression, and they appear for a moment immoveable in the air; then tracing by a slow and circular movement a reversed conical spiral figure they attain the end of their migration. Brilliant in all the splendour of their plumage and ranged in line, these birds offer a new spectacle, and represent a small army ranged in order of battle, the uniformity and symmetry of which leaves nothing to be desired; but the spectator should content himself with observing this peaceful colony from afar. Woe to him if he dare approach the lake at this deadly season.

Phœnicopterus parvus, Vieill. *Phœnicopterus minor*, *Flammant Pygmée*, Temm. M. Temminck observes that no difference is perceptible between the Flamingo of the Antient Continent and that of the New World in the form of the mandibles; their upper mandible shuts on the lower one, and is so constructed as to offer, when the bill is shut, a very slight difference in the height of the two mandibles. In *Phœnicopterus parvus* the lower mandible, very deep and strongly arched, is formed to receive, within the space which separates its walls, the whole of the upper mandible, which it entirely hides, so that the upper edges of the lower mandible raise themselves to the height of the surface of the upper jaw.

The plumage of the adult is pure rose-colour without spot or streak; the head, the neck, the back, and all the lower parts are of this beautiful tint, which is more lively and pure in the living bird than in the preserved skin, for the fugitive brilliancy of this tint becomes tarnished and passes into whitish from exposure to the light. The great wing-coverts and those of the tail are slightly deeper in colour than the other parts of the plumage. The whole wing is covered with feathers of a brilliant scarlet or purple, surrounded by a wide rosy border; the tail-feathers are black. Base of the bill, cere, and region of the eye deep purple: middle of the lower mandible orange-red, and the point black. Joint of the knee, toes, and their membranes of a fine red: the tarsus has a livid tint. Total length nearly three feet.

Young of the year.—White or whitish, marked with small brown streaks (mèches) spread over the head, the neck, the breast, and the coverts of the wings. The first red tints show themselves on the wings. *Bill* black. *Feet* of a reddish livid tint.

Locality.—Lakes of Africa. Those received by Professor M. Temminck were natives of the Cape of Good Hope. The young bird in the museum at Paris was brought from Senegal.



Phœnicopterus parvus.

* Suet. in Calig. 22. † Ibid. 57.

Species of the New Continent.

Phœnicopterus Chilensis (Molina), *Phœnicopterus ruber*, Red Flamingo (Wilson). This species *in its adult state* scarcely differs from the European Flamingo: it is perhaps not so bright. Catesby says, 'When they feed (which is always in shallow water, by bending their necks) they lay the upper part of their bill next the ground, their feet being in continual motion up and down in the mud, by which means they raise a small round sort of grain, resembling millet, which they receive into their bills; and as there is a necessity for their receiving into their mouths some mud, Nature has provided the edges of their bills with a sieve or teeth like a fine comb, with which they retain the food and reject the mud which is taken in with it. This account I had from persons of credit; but I never saw them feeding myself, and therefore cannot absolutely refute the opinion of others, who say they feed on fish, particularly eels, which seem to be the slippery prey Dr. Grew says that the teeth are contrived to hold.' The development of the gizzard in this genus makes it very probable that vegetable substances form part of the diet of the *Flamingoes;* but it is not likely that large fish, or indeed water animals of any great size, are ordinarily devoured by these birds. The bill is a colander, admirably contrived for separating the nutritious parts, whether animal or vegetable, from the mud and other useless parts.

Locality.—Warmer parts of North America, Peru, Chili, Cayenne, coast of Brazil, and the West India Islands, particularly the Bahamas, where they breed. Wilson speaks of it, but he gives Latham's description, &c. The prince of Musignano, in his 'Specchio Comparativo,' states that it is very rare and accidental in the neighbourhood of Philadelphia.

FLAMINI'NUS, TITUS QUINTIUS, was made consul, B.C. 198, before he was 30 years of age, and had the province of Macedonia assigned to him, with the charge of continuing the war against Philip, which had now lasted for two years without any definitive success on the part of the Romans. Flamininus having landed in Epirus, opposite the island of Corcyra, with a reinforcement of 8000 foot and 800 horse, marched up the country, where he found Philip posted in a rugged pass on the banks of the Aous, among the mountains of Eastern Epirus. After some fruitless negotiations with the king of Macedonia, the Romans, under the guidance of an Epirote shepherd, attained by a mountain path the rear of the Macedonian position, and Philip was obliged to make a hurried retreat across the chain of Pindus into Thessaly. He was followed by the Romans and their allies, the Ætolians and the Athamanians, who overran and ravaged the country. Meantime L. Quintius Flamininus, the brother of the consul, sailed with a fleet to the eastern coast of Greece, where, being joined by the ships of the Rhodians and of Attalus of Pergamus, he scoured the coasts of Eubœa, Corinth, and other districts which were allied or subject to the king of Macedonia. The consul himself marched into Phocis, where he took Elatea, and having there fixed his winter-quarters, he succeeded in detaching the Achæans from the Macedonian alliance. In the following year Flamininus, being confirmed by the senate in his command as proconsul, before beginning hostilities afresh held a conference with Philip on the coast of the Maliac gulf, and allowed him to send legates to Rome to negotiate a peace. The senate however having required the king to evacuate all the towns of Greece which he had occupied, including Demetrias in Thessaly, Chalcis in Eubœa, and Corinth, the negotiations were broken off and Flamininus resumed military operations. He marched from Phocis into Thessaly, where Philip was stationed near Larissa with a body of 16,000 phalanx men, 2000 peltastæ, and 5000 Thracian and other auxiliaries. After some previous demonstrations and partial attacks, the two armies met between Pheræ and Larissa, in a country broken by small hills called Cynoscephalæ, or Dogs' Heads. The Macedonians had at first some advantage, especially on the right wing where the king commanded in person, and where he had formed his phalanx on a hill, but Flamininus observing the left wing moving in column, with a narrow front to their assigned post, attacked it with his elephants and threw them into confusion before they had time to form. In the pursuit of this body a tribune of the victorious legion being led beyond the flank of the right wing, ventured to attack it on the rear, and he succeeded in spreading disorder into the ranks of the close and cumbersome phalanx. Panic pervaded the Macedonians; many threw down their arms and fled, and Philip himself, seeing the rout becoming general, left the field, and rode off towards Tempe. The Macedonians lost 8000 killed and 5000 prisoners on that day. Soon afterwards the king asked for a truce, which was granted by Flamininus, in order that messengers might be sent to Rome to treat of peace. The senate appointed ten legates, who, in concert with Flamininus, drew up the conditions, which were that Philip should evacuate every Grecian town and fortress beyond the limits of his paternal kingdom, that he should give up all his ships of war, reduce his military establishment, and pay 1000 talents for the expenses of the war. Flamininus was then continued in his command for another year, 196 B.C., to see these conditions executed. In that year, at the meeting of the Isthmian games, where multitudes had assembled from every part of Greece, Flamininus caused a crier to proclaim 'that the senate and people of Rome and their commander Titus Quintius, having subdued Philip and the Macedonians, restored the Corinthians, Phocæans, Locrians, Eubœans, Thessalians, Phthiotæ, Magnetæ, Perrhæbi, and Achæans to their freedom and independence, and to the enjoyment of their own laws.' Bursts of acclamation followed this proclamation, and the crowd pressed forward to express their gratitude to Flamininus, whose conduct throughout those memorable transactions was marked with a wisdom, moderation, and liberality seldom found united in a victorious Roman general. He checked by his firmness the turbulence of his Ætolian allies, who vociferated for the entire destruction of Philip, while he satisfied all just claims of the rest; and although his Macedonian expedition led ultimately to the entire subjugation of both Macedonia and Greece, yet he was at the time the means of restoring peace to both countries, and of protracting the independence of the Greek states for half a century longer. In the following year, 195 B.C., Flamininus was entrusted with the war against Nabis, tyrant of Lacedæmon, who had treacherously seized the city of Argos. Flamininus advanced into Laconia and laid siege to Sparta, but he met with a brave resistance, and at last agreed to grant peace to Nabis on condition that he should give up Argos and all the other places which he had usurped, and restore the descendants of the Messenians to their lands. His motives for granting peace to Nabis were, he said, partly to prevent the destruction of one of the most illustrious of the Greek cities, and partly because of the great preparations which Antiochus, king of Syria, was then making on the coast of Asia. Livy suggests, as another probable reason, that Flamininus wished to terminate the war himself, and not to give time to a new consul to supersede him in his command and reap the honours of the victory. The senate confirmed the peace with Nabis, and in the following year, 194 B.C., Flamininus having settled the affairs of Greece prepared to return to Italy. Having repaired to Corinth, where deputations from all the Grecian cities had assembled, he took a friendly leave of them, signifying to them that he was going to withdraw all his army and garrisons, and leave them to themselves; advising them at the same time to make a temperate use of that liberty which the Romans had been the means of restoring to them, and above all to preserve concord in their councils, as civil factions would certainly lead to the loss of their independence; for those who find themselves the weaker at home are apt to apply to strangers for support. He accordingly delivered the citadel of Corinth to the Achæans, withdrew his garrisons from Demetrias, Chalcis, and the other towns of Eubœa, and having broken up his camp at Elatea in Phocis, he sent the soldiers to embark on the coast of Epirus, whilst he repaired to Thessaly to settle the internal affairs of that country, which were in a state of great confusion. He organized the various towns, choosing the magistrates and senate from among the wealthier class. He then repaired to Oricum on the coast of Epirus, where he embarked for Brundisium. In Italy both he and his soldiers were received with great demonstrations of joy, and the senate decreed him a triumph of three days. On the first day were displayed the arms and the statues of brass and marble taken from the enemy; on the second the silver and gold, whether coined or in vases, shields, and various ornaments; and on the third the golden crowns, the gift of the liberated cities. Before the car of Flamininus appeared the captives and hostages, and among the latter Demetrius, son of Philip, and Armenes, son of Nabis, and in the rear fol-

lowed the Roman prisoners who had been sold as slaves to the Greeks by Hannibal during the second Punic war, and whose liberation Flamininus had obtained from the gratitude of the Greek states. The Achæans alone are said to have liberated 1200, for whom they paid 100 talents as compensation money to their masters. Altogether there never was perhaps a Roman triumph so satisfactory as this to all parties, and so little offensive to the feelings of humanity. In the year 183 B.C. Flamininus was sent to Prusias, king of Bithynia, upon the ungracious mission of demanding the person of Hannibal, then, in his old age, a refugee at the court of Prusias. Hannibal, however, by taking poison, avoided being given up. In the year 166 Flamininus was made augur in the room of C. Claudius deceased (Livy, xlv. 44), after which he is no longer mentioned in history.

FLAMSTEED, JOHN. The life of the first astronomer royal was known to the world chiefly by the results of his labours, until the year 1832, since which time his private affairs have been brought to light in an unexpected manner, and have excited great interest, not without creating some party feeling among those who cultivate the sciences connected with astronomy. In 1832 Mr. Francis Baily discovered that a considerable collection of Flamsteed's letters was in the hands of a private individual; which, on being examined, was found to contain much that was not generally known. On searching the Observatory at Greenwich, Mr. Baily found a vast mass of MS. observations, letters, and other documents, in the handwriting of Flamsteed and his friends, containing the curious history of which we shall give a brief abstract. The result of this discovery was a representation to the Board of Visitors of the Royal Observatory, who recommended the republication of the *British Catalogue*, with extracts from the papers of Flamsteed. The Lords of the Admiralty having decided to print this at the public expense, Mr. Baily undertook the preparation of the work, which appeared in 1835, under the title of 'An Account of the Rev. John Flamsteed, &c., &c., to which is added his British Catalogue of Stars, corrected and enlarged.' From this work, which is certainly the most remarkable scientific biography of the present century, we have entirely drawn the materials of this article. The original account is in part drawn by Mr. Baily from a manuscript by Flamsteed, headed 'Self Inspections, by J. F.,' which is a very interesting autobiography.

John Flamsteed was born at Denby, near Derby, August 19, 1646. His father was in some business, it has been said that of a maltster; he lost his mother when very young. At the age of fourteen he caught cold while bathing, which produced a weakness in the joints, from which he never recovered. He began his mathematical and astronomical studies at a very early age, and showed talents for constructing astronomical instruments. In 1665 he visited Ireland for the purpose of consulting a Mr. Greatraks, who professed to cure disorders by the touch, and of whose experiments in London a curious account exists. [BOYLE, ROBERT.] No effect being produced on him by this treatment, he returned to Derby, where his father lived, and where he had received his education. Here he continued his studies till 1669, and with great success. In or before 1667 he discovered the real causes of the equation of time, and wrote a tract on the subject, which was afterwards appended by Dr. Wallis to his edition of the works of Horrox, published in 1673. In 1669 he made an astronomical communication to the Royal Society through Oldenburg, their secretary, concealing his name under the anagram

J. Mathesin a Sole fundes,

which, being transposed, gives

Johannes Flamsteedius:

this same anagram appears in the title-page of the tables appended to the doctrine of the sphere in Sir Jonas Moore's system of mathematics, in the preparation of which Flamsteed had a share. An answer from Oldenburg, addressed to himself, showed him that he was discovered, and from that time, or rather from the date of a visit which he very shortly afterwards paid to London, he was in correspondence with many scientific men, but particularly with Sir Jonas Moore, who, in 1674, proposed to establish Flamsteed in a private observatory, which he intended to build at Chelsea. In the mean time however the fact of the very large errors to which astronomical tables were subject came to the notice of Charles II., on the occasion of a proposal made by a French gentleman for finding the longitude [GREENWICH OBSERVATORY], and that king determined to establish an observatory. Flamsteed was appointed astronomer royal, or, as the warrant ran, 'astronomical observator,' and carried on his observations at the queen's house, in Greenwich Park, until the observatory was ready, which was in July, 1676. From this time Mr. Baily dates the commencement of modern astronomy; nor can such chronology be disputed if we consider that we now return to Flamsteed's observations as the earliest with which it is desirable to compare those of our day, and also that Flamsteed's catalogue is the first which attained a precision comparable to that of later times. Flamsteed was in fact Tycho Brahé with a telescope: there was the same capability of adapting instrumental means, the same sense of the inadequacy of existing tables, the same long-continued perseverance in actual observation. But Tycho Brahé, a rich noble, found his exchequer in a king's purse; while Flamsteed, a poor clergyman, defrayed the expenses of his instruments himself, upon an ill-paid salary of one hundred pounds a year. Up to the year 1684 he had imposed on him the task of instructing two boys from Christ's Hospital, as one of the duties of his post; and, besides this, he was obliged to have recourse to private teaching, to meet the charges of carrying on his observations. At the very same time, that part of the public which cared about the matter were beginning to require that he should print his observations.

Almost at the outset of his labours he was so well known that Dr. Bernard invited him to become a candidate for the Savilian professorship of geometry at Oxford, which he declined to do. He had at this time nothing but a sextant and clocks of Sir Jonas Moore's, and some instruments of his own. He borrowed some from the Royal Society, and after repeatedly urging the government to provide him with an instrument fixed in the meridian, he caused a mural arc to be constructed at his own expense, which was erected in the year 1683, but proved a failure.

In the mean time he had taken orders, in 1675, having in the previous year obtained the degree of Master of Arts from Cambridge. It is not certainly known that he had been a student in that university, though it is certain that he was for some months at Cambridge in 1674. Perhaps he obtained his degree by the celebrity of his name, on condition of a short residence.

In 1684 his father died, and he was presented to a small living by the Lord-Keeper North. Both circumstances increasing his means, he resolved to be at the expense of a new mural arc, upon an assurance from the government (which was never fulfilled) that the outlay should be repaid. This instrument was first used in September, 1689, and from that moment 'everything which Flamsteed did, every observation which he made, assumed a tangible and permanent form, and was available to some useful purpose.' When he died, the government of the day attempted to claim these instruments as public property.

The public career of Flamsteed, from this time to the end of his life, is described when we say that he collected that enormous mass of observations which furnished the first trustworthy catalogue of the fixed stars; that he made those lunar observations on which Newton depended for the illustration and verification of his lunar theory; and that he originated and practised methods of observing which may be said to form the basis of those employed at the present time. Were it not for the celebrated quarrel between him on the one side, and Newton and Halley on the other, there would hardly be a life of so much utility as that of Flamsteed, which would afford so little materials for a popular account. It is to be remembered that the following is an *ex parte* statement; but on the other hand, it is not one formally drawn up for the public, but partly contained in the manuscript autobiography which never was published by Flamsteed, and partly derived from his correspondence with his friends. Many confirmatory circumstances of the general tenor of the facts appear in the letters of Newton himself; and even those who have (since the publication of Mr. Baily's work) defended the character of Newton, have not attempted to invalidate the account, but have mostly confined themselves to an attempt to show that Flamsteed did not appreciate the pursuits of Newton. The following is a sketch of the transaction. Newton had been on terms of cordial intimacy with Flamsteed, but a coolness, the cause of which is not discoverable, had begun to exist in the year 1696. In a letter to Dr

Wallis, intended for publication, Flamsteed mentioned his having supplied Newton with observations of the moon: this the latter took very ill, saying, in a letter to Flamsteed, 'I do not love to be printed on every occasion, much less to be dunned and teased by foreigners about mathematical things; or to be thought by our own people to be *trifling* away my time about them when I should be about the king's business.' Before this time he had furnished Newton with all the lunar observations which he had made.

When Flamsteed had completed his catalogue (having already expended 2000*l.* more than his salary), he began to think of printing his results. But Prince George of Denmark, having heard of the extent of Flamsteed's labours, offered, in 1704, to bear the expense of printing. A committee, consisting of Newton, Sir Christopher Wren, Dr. Arbuthnot, Dr. Gregory, and Mr. Roberts, was appointed to examine Flamsteed's papers, and reported in favour of printing all of them. The superintendence of the printing, the choice of workmen, &c. was in the hands of the committee, and not in those of Flamsteed. The latter gives the detail of various vexations to which he was subjected, and which ended (for the time) in a demand that Flamsteed should give up a manuscript copy of the catalogue of stars, which was the result of the observations, and was intended to be published at the end. This was done, with remonstrance, by Flamsteed; but the catalogue (as much of it as was ready) was sealed up; and Flamsteed declares that he understood it was to be kept sealed up until the whole of the rest was finished. It was three years before the first volume was printed; and during this time many small circumstances occurred which, if Flamsteed's colouring of the more important facts be correct, show a most determined intention on the part of the committee to give annoyance. Prince George died in 1708, before the second volume was begun; and the office of the committee was gone; but they still retained the papers in their keeping. Flamsteed, thinking nothing further about immediate publication, applied himself again to his observations. In March, 1710-11, he was surprised by being told that the seal of his catalogue had been broken, and that it was going through the press. Flamsteed immediately obtained an interview with Dr. Arbuthnott, who assured him that none of it was printed. This was not the fact; for in a few days Flamsteed himself received several printed sheets, and learned that Halley had publicly exhibited others in a coffee-house, and boasted of the pains he had taken in correcting their errors. The result was, that in 1712 appeared the book known by the name of Halley, and entitled 'Historiæ Cœlestis libri duo,' &c. Flamsteed, exceedingly irritated by the conduct of Newton and Halley, and being not naturally of a gentle temper, now kept no terms whatsoever with either. Newton had recommended the appointment of a board of visitors for the Observatory (made up of members of the Royal Society), and Flamsteed was summoned to the Royal Society, October 26, 1711, to know if his instruments (his own property) were in order, &c. Here a warm quarrel arose. Flamsteed declared to Newton that he had been robbed of his labours, and Newton called Flamsteed various names, of which *puppy* was the least. Newton reminded Flamsteed that he had received 100*l.* a year for thirty-six years, and Flamsteed asked Newton what he had done for 500*l.* a year which he had received since he came to London. Flamsteed charged Newton with having broken the seal of his catalogue, and Newton replied that he had the queen's order. After this interview, Flamsteed resolved to print all his observations, &c. at his own expense, and applied to Newton for the manuscript of 175 sheets of observations which were in his hands. The demand was refused, and Flamsteed commenced legal proceedings for their recovery. The result of the suit is not known; but Flamsteed states that Newton at last delivered all the contested manuscript to Halley. The additional expense caused to Flamsteed by this act of Newton was about 200*l.*

Queen Anne died in 1714, and the earl of Halifax, Newton's great supporter at court, in 1715. Flamsteed was now stronger with the government than his opponents; and the lords of the treasury, at his request, surrendered all that remained of Halley's edition (about 300 copies out of 400) to his mercy. These he immediately committed (in part) to the flames—a sacrifice, as he calls it, to heavenly truth—reserving only about ninety-seven sheets of each, which had been printed as he wished, and which afterwards formed part of his first volume. From this time to his death, which took place at the end of December, 1719, he was occupied in printing his 'Historia Cœlestis,' which, however, he did not live to finish. It was completed by his widow, with the aid of Mr. Crosthwait, his assistant, and his friend the celebrated Abraham Sharp, and was published in 1725. The maps, known by the name of Flamsteed's Atlas, were superintended by the same persons. The 'Historia Cœlestis Britannica' contains a complete account of the instruments and methods employed, together with a large mass of sidereal, lunar, and planetary observations, and the results of the former, namely, the British Catalogue. This work seems to us to occupy the same place in practical astronomy which the Principia of Newton holds in the theoretical part.

The very singular story of which we have given an outline did not, as might be supposed, appear without comment from the admirers of Newton's moral character. Mr. Baily, in a supplement to his account of Flamsteed, has condensed all the various replies (if so they are to be called) into four, to each of which he has given a rejoinder. To us it seems that the first three of the articles are utterly irrelevant, unless it be demanded as a postulate, that any one had a right to treat Flamsteed in any way which could be proved to be for the good of science.

1. It is said that Flamsteed did not appreciate Newton's lunar theory. 2. That he showed unwillingness to furnish Newton with the requisite lunar observations. 3. That he raised frivolous and vexatious objections to the printing. 4. That the committee had a right to break the seal of the packet.

To which it may be answered, 1. That very few of that day appreciated Newton's lunar theory, and that the same theory, as exhibited in the first edition of the 'Principia' (for the second was not published till after the quarrel), contained several points which were contradicted by observation, or, as Flamsteed says, 'rejected by the heavens.' 2. That it can be proved, from Flamsteed's lists of observations and from the correspondence of both parties, that the latter furnished Newton with every lunar observation which he had made; and that were it not so, he was under no obligation to supply lunar observations to any one. 3. That Flamsteed, besides depositing the imperfect catalogue and the 175 sheets of observations, appears, from the whole correspondence and from his subsequent exertions when he began to print for himself, to have been earnestly desirous of expedition.

With regard to the breaking of the seal, it is asserted that the contents were public property. This excuse did not occur to the mind of Newton himself, who, according to Flamsteed, only pleaded the queen's order. But the mere fact of the catalogue having been *sealed* proves that there was some understood reason for its not being immediately submitted to the inspection of the committee. If, as we have heard suggested, the deposit was a pledge on the part of Flamsteed that the manuscript should be printed, and if he refused to fulfil this pledge, undoubtedly the committee were justified in breaking the seal. But supposing it to be so, we may contend that the committee in such a case ought not, as men of honour, to have touched the seal, until they had first ascertained, by the fullest notice given to Flamsteed, that he was unwilling to fulfil the previous stipulation. It seems to us, on the whole, that the case is rather strong against Newton and Halley, and that their cause has been hurt, since the publication of the preceding details, by the attempt to defend where palliation was hardly tenable. It is by no means true that high intellect and high moral sense must exist together; and if, as Mr. Baily surmises, fifty years ago the editors of the 'General Dictionary' could not state what they knew of the quarrel from the fear that an exposure of Newton would injure their work, we see, in the recent publication, a gratifying proof of a better spirit.

Among the matters contained in Mr. Baily's preface is a complete refutation of a story derived from a provincial history, that Flamsteed, when very young, was convicted of highway robbery, and that a pardon was found among his papers. On searching the records, no such pardon is found entered, and various other circumstances make it physically impossible that Flamsteed could have been thus engaged at the time stated.

FLANDERS, EAST, a province of the kingdom of Belgium, bounded on the north by the province of Zealand, on the east by South Brabant and Antwerp, on the south by

Hainault, and on the west by West Flanders. It extends from 50° 42′ to 51° 22′ N. lat., and from 3° 25′ to 4° 26′ E. long.

East Flanders is politically divided into six departments, or

Alost,	containing	3 towns	and	74	communes.
Oudenarde,	"	2	"	55	"
Eecloo,	"	1	"	17	"
Ghent,	"	2	"	76	"
St. Nicholas,	"	2	"	26	"
Termonde,	"	1	"	25	"
		11 towns	and	273	communes.

The principal towns are Ghent, the capital, Alost, Oudenarde, Deynze, Eecloo, Grammont, Lokeren, St. Nicholas, Ninove, Renaix, and Termonde, or Dendermond. [GHENT; ALOST; OUDENARDE; EECLOO; GRAMMONT; LOKEREN; ST. NICHOLAS; RENAIX; TERMONDE.]

Deynze, about 9 miles south-west from Ghent, and 11 miles north-north-west from Oudenarde, near to the western border of the province, is a very antient town: it was sacked by the Normans in 880, and was bought by Count Robert of Flanders in 1316. It contained in 1830 a population of 3644, living in 546 houses. The town contains two churches, four schools, a town-hall, and a prison. It is a place of much trade, and is celebrated for the quality of the Geneva which is made in 13 distilleries: a great part of the inhabitants are employed in linen-weaving.

Ninove is situated 20 miles south-east from Ghent, and 12½ miles west from Brussels, on the left bank of the Dender. It is a well-built town, containing 816 houses and 4409 inhabitants. There are two churches and a chapel, a town-hall, an hospital, and ten schools. The principal trades carried on are in grain, flax, linen, and oil; there are four salt-refineries, seven flax-mills, some potteries, tobacco-manufactories, and oil-mills. The town owes its origin to the Goths, who built the castle in 411: it was enclosed with walls in 1194.

The principal rivers that traverse this province are the Schelde, the Lys, and the Dender. It is further watered by several smaller streams and brooks, all of which are tributaries to the Schelde, and the trade of the province is facilitated by many canals, the most important of which are those from Bruges to Ghent, from Ghent to the Neuzen canal, and the Moerwart canal, which branches off from the last-mentioned canal five miles north from Ghent, and joins the river Durme at Splettersputte.

East Flanders is low and level. In many parts of the province there are beds of peat, which are worked, and supply cheap fuel to the inhabitants, besides which the ashes are used as a dressing for the soil. Animal and vegetable remains, in a state of high preservation, are often found in these peat-beds.

The chief productions of the earth are wheat, rye, barley, oats, potatoes, flax, hemp, hops, madder, and tobacco. There is but little wood of large growth in the province; plantations for fire-wood and hop-poles are of frequent occurrence. Oaks are planted for the sake of the bark, and are cut down before they attain any considerable size.

The draught-horses bred in the neighbourhood of Ghent and Alost are large, well-formed, and powerful animals. Many of these horses are used in London for drawing the drays of brewers. Oxen are seldom used in Flanders for purposes of labour. The province contains 28,000 horses, 120,000 horned cattle, and 35,000 sheep, estimated in round numbers.

The population of East Flanders at the beginning of 1833 amounted to 742,793, of whom 180,813 inhabited the towns, and 561,980 the rural districts. The births and deaths in 1829 were—

Births—	Males	12,501	
	Females	11,970	
			24,471
Deaths—	Males	9,226	
	Females	9,495	
			18,721

Various manufactures are carried on in the province. Coarse hempen cloths are made by the women and young persons in the country districts. Lace, to which the name of Valenciennes has been applied, is made principally at Ghent, Alost, and St. Nicholas. Tulle, or bobbin-net lace, has been introduced of late years. Silk-weaving is pursued at Ghent and St. Nicholas. Cordage, bricks, hats, soap, and woollen-cloths are made in various parts of the province, which also contains numerous potteries, sugar-refineries, distilleries, and breweries. In 1834 there were fifty-seven steam-engines employed in cotton spinning-mills, principally at Ghent.

The civil government of the province is administered by a governor, who resides at Ghent. Courts of assize are held at Ghent, Oudenarde, and Termonde. A court of appeal, which has jurisdiction likewise over the adjoining province of West Flanders, is established at Ghent. That city is also the seat of a bishop. The number of schools in which daily instruction is given is 762, of which 158 are in the towns, and 604 in the country districts. The number of scholars frequenting these schools in February, 1833, was 28,750 boys and 23,427 girls, together 52,177. There is also at Ghent a normal school, supported by the government. Besides the daily schools there are many in which instruction is given on Sunday; one of these, established in 1810, receives 1400 boys and 1600 girls, at the annual cost of 340*l*., raised by voluntary contributions.

FLANDERS, WEST, a province of Belgium, bounded on the north and north-east by the North Sea; on the east by Zealand and East Flanders; on the south-east by Hainault; on the south, south-west, and west, by France. It lies between 50° 41′ and 51° 23′ N. lat., and between 2° 33′ and 3° 30′ E. long.

This province is divided into eight departments, viz.:—

Bruges,	containing	1 town	and	37	communes.
Ypres,	"	4	"	37	"
Courtray,	"	2	"	44	"
Thielt,	"	1	"	17	"
Roulers,	"	3	"	18	"
Furnes,	"	2	"	25	"
Ostend,	"	1	"	26	"
Dixmude,	"	1	"	25	"
		15 towns	and	229	communes.

The principal towns are Bruges, Dixmude, Courtray, Ypres, Iseghem, Menin, Nieuport, Ostend, Poperinghe, Roulers, Thielt, Thourout, Furnes, Warneton, and Wervick. [BRUGES; COURTRAY; YPRES; ISEGHEM; MENIN; OSTEND; POPERINGHE; ROULERS; THIELT; THOUROUT; FURNES.]

Dixmude, a town containing 3189 inhabitants, is situated 16 miles south-west from Bruges, on the right bank of the Ysere. This place was no more than a hamlet until 958, when Baldwin III. caused it to be walled in. It was fortified in 1270, and early in the fifteenth century it enjoyed so many privileges, that great numbers of inhabitants were attracted to it, and it became necessary to enlarge the town. This place was nearly destroyed by fire in 1333, and a similar calamity befel it in 1513, when the town-hall and more than 300 houses were burnt. Dixmude contains a fine parish church, a chapel, a hospital, and two orphan-houses. The principal trade consists in agricultural produce: the butter sold there is highly esteemed.

Nieuport, a fortified port, but little frequented except by fishermen, is situated about 5½ miles north-west from Furnes, and 19 miles south-west from Bruges, with both which places it communicates by means of canals. Nieuport was formerly a hamlet, dependent on the town of Lombarsyde, which was destroyed by a storm in 1116. In the next century the harbour was constructed, and by little and little the place took the form of a town, when it received the name of Novus Portus, or Nieuport. It was surrounded by walls and a ditch in the fourteenth century, and was reduced to ruins by the English in 1383, but rebuilt and fortified two years after by Philip the Bold. It was besieged in 1488 by the French, and was successfully defended, although three times assaulted by the besiegers. The battle of Nieuport, in which the Archduke Albert was defeated by Prince Maurice of Nassau, was fought in 1600 near to this town: it was taken by the French in 1745, 1792, and 1794. The population at the beginning of 1830 consisted of 3028 persons, of whom 1450 were males, and 1578 females. The town at that time contained 528 houses: there is a handsome church, a chapel, a town-hall, two hospitals, an orphan asylum, and an arsenal. The fisheries, and especially the herring fishery, is the most considerable branch of industry carried on.

Warneton stands on the left bank of the Lys, six miles

south-south-east from Ypres. This place belonged formerly to a family of the same name with itself, and it was fortified in 1127. At the beginning of 1830 it contained 1153 houses and 5614 inhabitants, of whom 2756 were males, and 2858 females.

Wervick is situated on the left bank of the Lys, by which it is separated from France: it is seven miles south-east from Ypres. The population in 1830 was 5461; viz. 2595 males, and 2866 females. The number of houses was then 939.

The principal rivers of the province are the Lys, the Schelde, and the Ysere. The Lys has its source in the department of the Pas de Calais, in France. It enters West Flanders near Warneton, passes in a north-east direction across the southern part of the province, and enters East Flanders near Deynze. The Schelde forms the south-eastern boundary of the province, separating it from Hainault. The Ysere rises in the department Du Nord, in France; entering the province of West Flanders near to Rousbrugge, it flows north-east to Dixmude, and thence north-west to Nieuport, where it joins the sea. There are several other inconsiderable streams in the province, and the communications between different places are facilitated by means of navigable canals: the most important of these are the canals between Ghent and Bruges, Bruges and Ostend, Dunkirk, Furnes, and Nieuport. The coast of the province is constantly threatened with encroachments from the sea, to prevent which unceasing vigilance and activity are required.

The soil of West Flanders is in general sandy, particularly towards the sea. Brick earth, pipe-clay, and peat moss, are also found in different places. The sand is in some parts covered with a stratum of vegetable mould, but in most other parts the soil is very light and poor. The whole province is a plain, with scarcely a rising ground to break the view. Wheat, oats, flax, rape, trefoil, turnips, carrots, potatoes, and tobacco, are all cultivated. The quality of the tobacco raised in the neighbourhood of Wervick is much esteemed.

There are considerable woods in the department of Bruges, Ypres, and Courtray, the greatest part of which woods belong to the state. The principal trees are the birch, oak, ash, hornbeam, elm, beech, poplar, pine, plane, lime, larch, chestnut, and elder. Willows are frequently seen, but always as pollards.

The horses of the province are large and heavy, fit only for draught; there are about 24,000 in the province. Of horned cattle there are 130,000, which exceed the wants of the inhabitants. Many oxen are accordingly fattened and sold, and a considerable quantity of butter is made for exportation. There are about 40,000 sheep.

The population of West Flanders in 1836 was 615,904. The numbers of births, marriages, and deaths, in the preceding year, were as follows:—

Births—Males—In towns	3,003		
„ „ In country	8,241		
		11,244	
Females—In towns	2,863		
„ In country	7,662		
		10,525	
		21,769	
Marriages		4,354	
Deaths—Males—In towns	2,446		
„ „ In country	5,739		
		8,185	
Females—In towns	2,434		
„ In country	5,737		
		8,171	
		16,356	

A great proportion of the inhabitants of the province are employed in spinning flax, and weaving and bleaching linen. The manufacture is altogether a domestic one, and is carried on in the farm-houses during winter, and at other times when the operations of the field are necessarily interrupted. Damask and table-linen are made in the towns of Courtray and Bruges. Much lace is made at Bruges, Ypres, Courtray, and Menin, the thread for which is spun at Courtray. More than a sixth part of the population of Bruges are said to be engaged in this manufacture, and there are 200 schools in the town in which the art of lace-making is regularly taught. There are in the province 78 establishments for dyeing; the largest are at Courtray, Bruges, Poperinghe, and Roulers. Woollen cloths, mostly of homely quality, fitted for the use of the working classes, are made at Bruges, Ypres, and some other parts of the province: the wool employed is all of domestic growth. The principal articles imported are groceries, dyeing drugs, metals, timber, wine, and salt; the exports consist chiefly of linens, lace, linseed-oil, rape-oil, geneva, horned cattle, and grain.

Agriculture. Flanders was remarkable for the cultivation of its soil long before any other country north of the Alps or Pyrenees. This was the natural consequence of its commercial prosperity: and although very little change has taken place, and very few improvements have been introduced for more than a century, it still ranks foremost amongst agricultural countries.

It is not the richness of the soil which is the cause of the abundant harvests which the Flemish peasants reap, but their indefatigable industry. The greater part of the land in Flanders is, naturally poor; and in extensive districts, which now have the appearance of the greatest richness at harvest time, the original soil was once little better than the blowing sands which are met with in the neighbourhood of the sea. Neither is it a genial climate which brings forward the fruits of the earth in abundance; for the climate is inferior to that of France or the southern parts of Germany; and if there are not so many or so sudden changes of weather as in Great Britain or Ireland, the winters are longer and more severe. The average temperature in summer may be somewhat higher than in the counties which lie in the same parallels in England, and the time of harvest somewhat earlier; but this does not make a difference of more than a week in the maturity of every kind of grain. The winters are more severe, in ordinary years, and the snow lies longer on the ground.

The soil may be divided into two classes. The first consists of the alluvial clay-loams near the coast; the second, of various sands and light loams which are found in the interior. The most fertile is that of the low lands which have been reclaimed from the sea by embankments: it is chiefly composed of a muddy deposit mixed with fragments of marine shells and fine sea-sand. These lands are called polders, and their great natural fertility causes them to be cultivated with less art and industry than those lands which are much inferior.*

The cultivation in the polders has nothing remarkable to entitle it to much notice. Barley seems peculiarly suited to the soil, and very heavy crops of this grain are obtained; especially in those polders which, having been more lately embanked, are not much exhausted. Eight and even ten quarters per acre have been obtained with little or no manure; and the second crop of barley sown in succession has often been the best. Oats are also very productive and of good quality, from ten to twelve quarters per acre. But these heavy crops soon reduce the natural fertility, and after a few years the produce is greatly diminished, and the land requires to be recruited by manure and cleansed by fallows. The usual rotation of crops in the polders consists of,—1. Winter barley after a fallow;—2. Beans;—3. Wheat;—4. Flax;—5. Clover;—6. Potatoes. If the potatoes have a favourable season, and the land can be cleared of weeds, the rotation begins again without a fallow year: but this is seldom the case, and the land is usually fallowed once in six years. The crops here mentioned are occasionally varied according to circumstances and manure, as well as the small quantity of dung made on the farm will permit. The polder farmer seldom thinks of purchasing manure; and even the ashes made by burning weeds are usually sold, to be sent to the poorer sandy soils, where their effects are more perceptible. They keep a sufficient number of horses to till the land, and often put four to a plough, which is the common turn-wrest plough, there called the Walloon plough. If this number is not absolutely necessary, they overlook

* The soil of the polders, when first brought into cultivation, gives by analysis the following proportions in its composition:—

Calcareous sand, mostly broken shells	13
Silicious sand	5
Fine clay and vegetable matter	81
Soluble matter and loss	1
	100

If this is compared with the soils as classed by Thaer [ARABLE LAND, vol. ii, page 223], it will be found to resemble his richest wheat soils which he places in his first classes.

the saving which might be effected, and pride themselves on the fat and sleek appearance of their team. No more cows are kept than are necessary for the supply of the family; and for want of winter provision for cattle few oxen are stalled. The dung is mixed in heaps, and turned over before it is carried upon the land. There are no tanks to receive the urine, this manure not being thought so useful in heavy soils as in the light. In short, the agriculture of the polders is far inferior to that of the interior, and not much advanced before that of the other nations in Europe. It is much inferior to that of Kent and Essex on similar soils. When the polders have been too much exhausted they are frequently laid down to grass; and in a few years a very rich pasture is produced. If, instead of sowing only a few refuse hay-seeds from the lofts, proper grass seeds were sown, after the land has been cleaned by a fallow, the pasture would much sooner come to perfection, and several years would be saved; but the improved modes of converting arable land into pasture, so advantageously practised in the north of England and in Scotland, are almost entirely unknown in Flanders. The extent of the farms in the polders is from 100 to 250 acres. The farmers in general are in good circumstances and the buildings substantial. There formerly existed a curious mode of letting farms, which still remains in some few places. The farmer hired the buildings and a portion of the land on his own account, and the remainder he undertook to cultivate on a joint account with the owner: that is, he did all the work, and the produce was sold on the ground: half of it went to the farmer and half to the landlord. No scheme could be more ingeniously devised to bring down the fertility of the soil; for it is evident that all the manure would go to that part of which the farmer had the whole produce. Accordingly this arrangement could only last for a short time, and on the newly embanked lands.

The air of the polders is unhealthy, and all those who are not inured to the climate are subject to fevers and agues. On this account land lets at a lower rate, and the wages of labour are higher in the polders than in more healthy districts.

In the interior of East and West Flanders the soil varies considerably; but the principal part is of a sandy nature. The sand, and a heavier loam which scarcely deserves the name of clay, are found much intermixed, which is owing to an alternation of layers of sand and loam, which are found by digging to a considerable depth. These layers are not of great thickness; and the accidental circumstance of the washing away of the sand in some places, and the depositions from the rivers in others, easily accounts for this variety. Some of the elevations, which are no where considerable, consist of a very poor sand, and suggest the idea of their having once been the sands of the sea blown into hills, as is observable on the coast. These hills, if they may be so called, are naturally so barren, that they were, not very long since, covered with heath or at best planted with fir-trees. But they have gradually been cultivated and improved, and only a few remain in their original state of heath or wood. These elevations of the surface have determined the course of the principal rivers, and the hollow or basin in which each of these flows is marked with some peculiarity of soil. Thus the basin in which the Schelde flows from the borders of France to Ghent consists chiefly of a good loam, in which there is a considerable portion of clay. To the east of this is the basin of the Dender from Grammont to Termonde, which consists of the stiffest soil in Flanders; to the west, that of the Lys, which is a sandy loam. That of the Langelede, which is intersected by the canal from Ghent to Bruges and Ostend, is mostly a poor light sand; and lastly, in that of the Durme, which is a branch of the Schelde, and between it and the main river, a very low flat country, the soil is a light sandy loam enriched by the deposition of mud from antient inundation of the rivers, which are now confined within banks or dykes. In each of these districts almost every variety of soil occurs; but the general character is distinct, and the cultivation of the land is varied accordingly.

The poorer sands have been brought into cultivation chiefly by the persevering industry of small proprietors and occupiers. Without an abundance of manure nothing can be effected there, and consequently every attention is paid to the procuring and collecting of it. The first process is always to trench the ground deep with the spade, and level it by means of the mollebaert an instrument peculiarly Flemish, of which a drawing and description are given in vol. iii., p. 9. [BARREN LAND.] The next step is to procure liquid manure, which consists of the urine of cows and horses, the drainings from dunghills, and the emptyings of privies. The numerous towns and villages which are scattered over Flanders, and the canals which intersect the country in all directions, facilitate the collecting and transporting of manure. A regular trade is carried on in everything which can enrich the land; nothing which can be of any use for this purpose is lost or wasted. In every farm there is a large vaulted cistern, in which the liquid manure is collected, and where it is occasionally stirred to excite fermentation, and make it more efficacious when it is carried upon the land.

Experience has taught that manure put on light land in a liquid state is much more immediately effective than when the solid dung is ploughed in, but that its effects are also much less durable. This has led to the practice of frequently renewing the manure, and pouring the liquid over the growing crops as a top-dressing. Considerable care is required to give the proper quantity, and to regulate the strength according to circumstances; for too great a dose might destroy the crop, or produce great luxuriance on the leaf at the expense of the fruit or seed. The urine and other hot substances impregnated with saline particles are therefore diluted, if the weather is dry, before they are used, or they are poured over the soil some time before the seed is sown, that they may sink in and be more diffused.

At a distance from large towns it would be impossible to obtain the requisite quantity of manure, and accordingly it is made on the farm. The cattle are the principal source of the supply; but every expedient is resorted to in order to increase the quantity and improve the quality. Every kind of vegetable or animal matter is carefully collected, and made to undergo the putrefactive fermentation by being mixed with others already partially decomposed. Nothing excites heat and putrefaction more than urine when it is poured over substances subject to decomposition. In every farm-yard there is a cavity or pit into which the objects to be acted upon can be thrown, and into which the urine or drainings of the dung-hill can be made to flow: by frequently moving and stirring the mass, the decomposition goes on rapidly, heat is evolved, and the fibres and dried juices of vegetables are decomposed, and become soluble in water, in which state their effect on vegetation is greatest. The place in which this is going on is called in French a *croupissoir*, and in Flemish a *smoor hoop*. It is generally thought most advantageous that the manure should be ploughed into land in an active state of fermentation, and in order to secure this, it is in some places laid on the land in heaps, and each heap is moistened with urine. This soon renews the fermentation; and as soon as the heap begins to heat, it is spread out, and the manure is immediately ploughed under.

When the supply from the yard and from the vaulted cistern, together with what can be purchased, is not sufficient, recourse is had to the refuse cakes of colza from which the oil has been pressed out. These are dissolved in urine or in water, and put into the cistern to decompose. When it is in a proper state it is used chiefly on the land on which flax is intended to be sown, as it is a very rich manure, and perfectly free from the seeds of noxious weeds.

In the tillage of the land the Flemings use few and very simple instruments. The common plough for light lands is a small light foot-plough, so called from a piece of wood inserted in the beam, which is somewhat in the shape of a foot, or rather of the wooden shoe in common use in Flanders. It has no wheels, and is drawn by one or two horses. It is the parent of the Rotherham plough, from which most of the improved ploughs for light soils are derived. It is the most perfect plough for light sands, acting like a shovel at the fore part of the turn-furrow, which is concave, and completely turns over the soil. In the stiffer soils the turn-wrest plough is sometimes used, made much smaller and lighter than the heavy Walloon plough. It has two small wheels attached to that part of the beam where a single wheel is sometimes put by means of a small iron bar, which is connected with the middle of the axle by means of a pin, so that whatever be the inclination of the axle caused by unevenness of ground, or by one of the wheels running in the furrow, this bar always remains upright, and supports the end of the beam. This plough is much steadier than

the foot-plough, and better adapted to break up very stiff ground.

An instrument peculiarly Flemish is the *traîneau.* This is a wooden frame of a triangular shape, covered with boards, which is drawn over the ground to smooth the surface and press in the seed. The harrows in common use are also triangular, and made entirely of wood; the pins are driven obliquely and point forwards, so as readily to enter into the ground when the harrows are drawn by the angle. The blunt end of the pins projects about an inch or more on the side from which they are driven in: thus, by reversing the instrument, a slighter degree of harrowing is given, which has an effect intermediate between that of the harrows and the traîneau.

The mollebaert, another Flemish instrument for levelling ground, has been already noticed. The Hainault scythe and hook are generally used for reaping corn. The instrument is held in the right hand, and the hook in the left: by a swing of the arm the corn is cut close to the ground towards that which is standing; the hook collects it and rolls it up into a sheaf, which is taken up by means of the leg and the scythe, and laid down to be tied. It is better than a fagging-hook, and does the work more easily. These are the only instruments in common use which differ at all from those of other countries. None of the more complicated modern inventions have been introduced, nor would they be readily adopted, however ingenious or useful they might be; for an adherence to old established methods, and a repugnance to what is new are no where so firmly rooted as amongst the Flemish peasantry.

The most important instrument in Flemish agriculture is the spade, which is used to a much greater extent than in England; and in some instances is the only instrument of tillage. The trenching spade is made light and long, and is well adapted to the loose sandy soils. The first step to improvement is generally a complete and deep trenching; and in the Waes district a sixth part of the whole farm is trenched every year; and where this is not done, the intervals between the stitches in which the land has been ploughed are dug out with the spade a foot or sixteen inches deep, and the earth thrown evenly over the beds in which the seed has been sown. By shifting these intervals a foot every year, the whole of the land which lies in stitches six feet wide is dug, and the upper and under soil mixed regularly. This process is extremely useful in producing an even crop, especially of flax, the roots of which strike deep.

The rotations adopted in light sands and loams are various. In the poorest and least improved, buckwheat, rye, and oats are the chief crops, with potatoes and clover, which require more manure. Every crop is manured except buckwheat, which grows well in the poorest soils, and becomes too luxuriant to give much seed in rich and highly manured lands. Bones have not been introduced except by way of experiment; but when their value on light soils shall be more generally known, especially in raising turnips, there is no doubt but they will be extensively used. This may lead to the folding of sheep to eat them on the land, and thus introduce an important improvement into Flemish husbandry.

On the better kinds of light soils, which are not well adapted for wheat, the usual course is 1st, rye, with turnips in the same year after the rye is cut; 2nd, oats; 3rd, buckwheat; 4th, potatoes or carrots; 5th, rye and turnips; 6th, flax; 7th, clover.

When the sand becomes a good light loam, wheat is introduced in the rotation, after potatoes or after clover: the latter is thought the best practice, as the roots of the clover both enrich and consolidate the soil.

Rye recurs more frequently than would be thought prudent if it were not for the turnips sown after it, which seem to correct the effect produced on the soil by the seeding of the rye; so that rye and turnips are sometimes followed by rye, in which clover is sown in the next spring. Thus rye and turnips may alternate in light lands, as beans and wheat sometimes do in rich heavy clays. The turnips are never eaten on the land where they grow, but are always drawn and housed in the end of September, the green tops being cut off and given to the cows and pigs, and the roots stored in dry cellars. The land is then immediately ploughed after some dung has been put on; and if oats are the next crop which are sown in spring, it remains so all winter.

When the land is of a better quality, although still in the class of light loams, wheat recurs more frequently, and the rotation is varied as follows:—rye and turnips, potatoes, wheat, rye and turnips, oats, flax, clover, wheat. If the soil is fit for barley, this grain is substituted for rye. Carrots are frequently sown in the barley, and also in the flax. They strike deep into the rich light earth, but come to no size while the principal crop is on the ground. As soon as this is taken off, the land is harrowed and carefully weeded by hand: liquid manure, diluted if the weather is dry and warm, is spread over the surface, and in a short time the carrots throw out their green tops, and swell in the ground: by the end of September a considerable crop of them may be dug up. The best variety for this purpose is a large white carrot, which rises some inches out of the ground; it has been lately brought into notice in England, and will no doubt soon be more generally cultivated. [CARROT.] There is another variety which is yellow, and also attains a good size; but it is inferior to the first in good ground. The quantity of roots raised for the winter provision of the cattle is considerable, and forms a very important part of the husbandry of Flanders, where all the cattle are constantly kept in the stables in winter, and, except where there are natural pastures, in the summer also.

Flax is every where a most important crop, for it much exceeds all other crops in value. Where it can be raised of a tolerable quality, every other crop has a reference to this; and the rotation is arranged accordingly. There is no country where more attention is paid to flax than in Flanders, especially in the neighbourhood of Courtray. The land is brought into the highest state of richness and cleanness before flax is sown in it; and the most abundant manuring with rape cake and urine is thought essential to raise this crop in perfection. [FLAX.]

On the heavier loams colza, or rape [COLE], is an important crop for the seed from which the oil is expressed. It is sown in a bed in July or August, and planted out in rows two feet apart in October. The seed ripens early in the next summer, and a good crop of turnips may be had after it. The summers being in general warmer and drier than in England, the Flemish farmer is enabled to thrash out his rapeseed on a cloth in the field soon after the stems have been cut and laid gently on the ground to dry the pods. Any delay in this operation would cause a great loss: with every care and attention, much seed is always scattered in harvesting; because the pods do not ripen equally, and some will have shed their seeds before others are sufficiently ripe to be gathered.

Potatoes were introduced into Flanders from England about the year 1740, and from being at first only cultivated as a rarity, soon became an important part of the food of men and beasts. There is nothing peculiar in the Flemish mode of cultivating this useful root. The sets are planted with a blunt dibble, as is the case in gardens in England: sometimes they are laid in the furrows and covered with the plough: they are always earthed up round the stems, sometimes by a plough with a mould-board on each side, but generally by hand with a broad hoe. The manure usually put on the land in which potatoes are to be set is double the quantity used for a corn crop; and a good soaking of the soil with urine is thought to invigorate the growth of the plant greatly. The produce however is not much more abundant than it is usually in those parts of England where potatoes are raised in considerable quantities in the fields—about 300 bushels on an acre. There is a small yellow potato in Flanders, which is excellent when boiled, and which grows well in a stiff loam, but it is not so productive as the large cattle potato.

The cultivation of the sugar beet has been resumed lately, after it had been entirely abandoned. There are now several considerable manufactures of beet-root sugar, but it is not a favourite culture with the farmers, not even for their cattle, as it is too long on the ground. They prefer turnips and carrots, which can be raised on the same land which has borne another valuable crop the same year.

In the heavier loams, which are chiefly to be met with in West Flanders and about Alost, the following rotation is adopted:—flax, clover, barley or oats, beans, wheat, rye and turnips, potatoes, colza and carrots, flax; or flax, colza, wheat, rye and turnips, oats, clover, wheat, rye.

Beans are not a favourite crop, and are not carefully cultivated. They are sometimes sown very thick, mixed with pease and tares, to be cut up in a green state for the cows and pigs; and in this way they produce a great quantity of

green food, and clean the ground by excluding the air and smothering the weeds. On a farm of 36 bonniers, in a very good loamy soil near Courtray, the land was divided into 6 equal parts of 6 bonniers each, and the crops were distributed as follows:—

Clover.	Wheat.	Wheat.
Carrots.		Beans.
Potatoes.		
Rye & Turnips.	Flax.	Oats.
	Colza.	

The manure used for these crops was partly dung from the yard and cows' urine, but chiefly the sweepings of the streets and the emptyings of privies from Courtray.

In a very rich loam, not far from Ypres, the following crops were noticed in regular rotation:—1, turnips with chicory and carrots; 2, oats; 3, clover; 4, wheat; 5, flax; 6, wheat; 7, beans; 8, wheat; 9, potatoes; 10, wheat; 11, oats. All these crops are of an exhausting nature, and it requires a very rich soil, aided by abundant manuring, to bear this rotation for any continuance; but each of these crops had a good portion of manure.

Great attention is paid to prepare the land so as to secure a good crop from a small quantity of seed. The seed usually sown in Flanders is about one-third less than in England, even when the seed is drilled, which it never is in Flanders. The ground is rendered mellow and rich by the tillage and the liquid manure; and the seed, which has been carefully selected, is covered by earth spread over it with the spade: it is afterwards rolled or trod in with the feet. Every grain vegetates, and should there be any slowness in the growth, the urine-tank supplies an excellent stimulant. It is in the springing of the blade, after the farina in the seed is exhausted, that the liquid manure seems to produce the greatest effect. When the stem is shot up, it may perhaps too much encourage the increase of green leaves, and thereby hinder the formation of the flower and the seed: experiments made with liquid manure lead to this conclusion.

There are some very rich pastures in Flanders about Furnes and Dixmude, where excellent butter is made. A great many beasts are fed in the summer and a moderately sized ox turned out in good condition in April or May will fatten on an acre of land by August or September. The best cows and oxen are of the Dutch breed; those which are bred in Flanders are inferior. The butter about Dixmude is churned from the cream only, although the most common practice is to churn the whole milk after it has stood some time and begins to be acid. It is always set in shallow pans immediately after milking, and left so twelve hours. The cream is then skimmed off, or the whole milk is poured into deep vessels till it is fit to be churned. The churning is performed in a barrel-churn or a plunge-churn: in either case, in the larger dairies, it is moved by a horse, which turns a wheel connected with the churn.

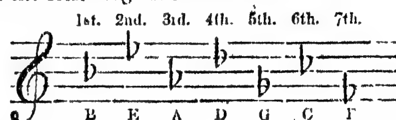
The breed of horses in Flanders is large and heavy, but deficient in activity and clumsy in form. The mares were once in repute for heavy carriages, but at present an equipage drawn by Flanders mares would be an object of wonder, if not of ridicule. Many horses have been imported into England from Flanders as cart horses; but they were preferred chiefly on account of the price at which they could be obtained, and of the apparent bulk of them. For active and enduring qualities they are much inferior to our best breeds of English cart horses.

The Flemish sheep are coarse in the wool, and much inferior in the carcase to the Leicester or South Down. Some good sheep have been imported which may much improve the native breeds. The pigs are as badly shaped as can well be imagined: long in the neck and head, and high on their legs. They are badly fed when young, and fatten slowly, although in time they acquire considerable weight. A better breed has been introduced which will soon supersede the old.

The farm buildings are very good and convenient in general. The farms are small, compared with those in other countries; 120 acres is considered a very considerable occupation. In the Waes country where the spade is extensively used in the cultivation of the land, the farms are very small, fifty acres being amongst the largest, and the average is not above fifteen. A farm of this description requires only one horse to cart the manure and plough the land; four or five cows are the usual complement, with two or three pigs. The cows are fed on clover in summer, and on barley or oats cut green; in winter on potatoes, beet-root, turnips, and carrots, which are chopped up together and boiled in a copper. This is given milk-warm three times a day, and is called brassin; when grains can be procured from the brewers they are added to the mess. The cows never move from their stalls: after having had three or four calves a cow is generally fattened and sold off; and a young heifer, of which a couple are reared every year, supplies her place.

FLANNEL. [Woollen Manufactures.]

FLAT, in music, a character originally represented by a small *b*, though time has somewhat altered its outline, and the following is now its form—♭. The Flat is used to lower, or depress, by the degree of a semitone, any note in the natural scale. In antient music, before the character of the Natural was introduced, the Flat was employed to reduce any note which had been made sharp, to its natural state. Where Flats are placed at the clef, they are always taken in the following order:—



When a Flat, not appearing at the clef, occurs in any other part of the composition, it only affects the bar in which it is placed, and is called an *Accidental Flat.*

The Double Flat (𝄫) is frequently employed in very chromatic music. It lowers a note two semitones below its natural state. Thus, B *double-flat* (𝄫) is, in fact, A *natural*, &c. This character is used chiefly in Enharmonic modulation [Enharmonic], in which it is practically convenient, if not absolutely necessary, occasionally to have an additional name for each note in the diatonic and chromatic scales.

FLAX (*Linum perenne*) is an annual plant, cultivated from time immemorial for its textile fibres, which are spun into thread and woven into linen cloth. It has a green stem from a foot and a half to two feet high, and a blue flower, which is succeeded by a capsule containing ten flat oblong seeds of a brown colour, from which an oil is expressed, which is extensively used in manufactures and in painting. There are several varieties of flax cultivated; the best seed comes from Riga and from Holland. As the different varieties arrive at maturity at different times, and the stem rises to different heights, it is very essential that the seed be not mixed, as this would occasion great inconvenience and loss in the pulling of the flax. There is a very fine long variety which is cultivated in the neighbourhood of Courtray, in Flanders; it requires a very good soil to grow in, and the stem is so long and slender that if it were not supported the least wind would break it and lay it flat, in which case the quality of the flax would be much impaired and the quantity reduced. To prevent this, short stakes are driven into the ground in a line at eight or ten feet from each other, and long slender rods are tied to them with oziers about a foot or eighteen inches from the ground, forming a slight railing to support the flax: a number of these are placed in the same manner at a short distance from each other in parallel lines all over the field, and the flax is thus prevented from being beat down. A better method, which is not commonly adopted, is to have stakes in regular rows, and thin ropes tied to them instead of

rods: by having these lengthways and others across them at right angles, a kind of large net is spread over the whole field, and none of the flax can possibly be laid flat. By using cheap rope or strong tar twine from old cables, the expense is not very great, and much less room is taken up than by the rods. When the flax is pulled, the stakes are taken up, and removed to a dry place till they are wanted again.

The most common variety of flax is of a moderate length with a stronger stem: if it is not sown very thick it will throw out branches at top and produce much seed: it is therefore a matter of calculation whether it will be most profitable to have finer flax with less seed, or an inferior quality with an abundance of seed.

There is a small variety which does not rise above a foot, grows fast, and ripens its seed sooner. When linseed is the principal object, this variety is preferred; but the flax is shorter and also coarser.

Another variety of flax has a perennial root, and shoots out stems to a considerable height. It came originally from Siberia and was much recommended at one time, but its cultivation did not spread. If it were sown in wide rows and kept free from weeds by hoeing, it might perhaps be profitably cultivated for the seed; and if the flax is inferior in quality, it might still be of some value for coarse manufactures; it requires however to be renewed every three or four years and sown in fresh ground.

The soil best adapted to the growth of flax is a deep rich loam in which there is much humus, or vegetable mould. It should be mellow and loose to a considerable depth, with a sound bottom, neither too dry nor too moist: either extreme infallibly destroys the flax; it is therefore not suited either to hot gravelly soils or cold wet clays, but any other soil may be so tilled and prepared as to produce good flax. It thrives well in the rich alluvial land of Zealand and the polders, but it is also raised with great success in the light sands of Flanders, but much more careful tillage and manuring are required. The land on which flax is sown must be very free from weeds, the weeding of this crop being a very important part of the expense of cultivation. These circumstances suggest the best mode of preparing the land. A long fallow, such as is sometimes given to the land in Essex, including two winters and a summer, may be a good preparation on the heavier loams, which should be trench-ploughed and worked deep; the manure should be dung fully rotten, or a compost of earth and dung; it should be put on the land in autumn, and well incorporated before the seed is sown. If the land is sufficiently clean, a crop of potatoes well manured may be substituted with advantage for the fallow; but at least double the usual quantity of dung should be given to this crop that enough may remain in the ground for the flax. Lime may be used if the soil contains a great portion of clay; but in the lighter loams there is some doubt of its advantage for flax. At all events it should not be used immediately before the flax is sown, but for some previous crop. Peat-ashes are excellent; they improve the soil and keep off insects, which are apt to injure the roots of the flax. For want of peat-ashes, those made by the burning of weeds and earth in a smothered fire are a good substitute. But the most effective manure is the sweepings of the streets in towns mixed with the emptying of privies and the cleaning out of the butchers' stalls and shambles. On light soils much manure is required; and where night soil cannot be obtained in sufficient quantities, rape cakes, from which the oil has been expressed, dissolved in cows' urine, form the best manure. In many parts of Flanders 500 rape cakes are used for every acre of flax, besides the usual quantity of Dutch ashes and of liquid manure, which is the drainings of dunghills and the urine of cattle collected in a cistern and allowed to become putrid.

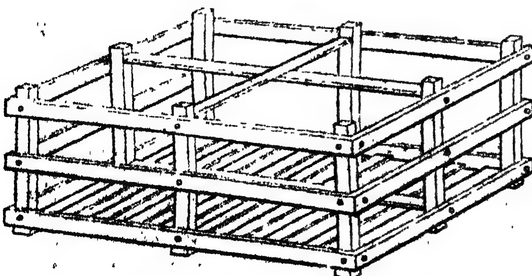
In southern climates flax is sown before winter, because too great heat would destroy it. It is then pulled before the heat of summer. In northern climates the frost, and especially the alternations of frost and thaw in the early part of spring, would cause the flax to perish; it is consequently sown as early in spring as may be, so as to avoid the effect of hard frost. This is in March or April in Great Britain and Ireland, and in Holland and Flanders. In no country is the ground better prepared for the growth of flax than in Flanders; and it may therefore be interesting to follow the whole process of Flemish cultivation for several crops preparatory to that of flax, which is the most important produce in that country, and that which, when well managed, gives the greatest profit to the farmer. The best flax grows near Courtray. The soil is a good deep loam, rather light than heavy. It is not naturally so rich as the soil of the polders in Flanders and in Zealand, but the tillage and cultivation are far more perfect, and the produce, if not more abundant, is of a finer quality. Every preceding crop has a reference to the flax, and is so cultivated as to improve the texture of the soil, which is abundantly manured in order to leave a considerable surplus in the ground. If the land has not been trenched all over with the spade to the depth of eighteen or twenty inches it has been equally well stirred by the narrow open drains which are dug out twelve or fifteen inches deep every year between the stitches in which it is laid by the plough. These drains, or water-furrows, are a foot wide, and from a foot to eighteen inches deep. The earth taken out of them is spread evenly over the land after the corn is sown. When the ground is ploughed again, care is taken that the place of these water-furrows shall be shifted a foot on each side. Thus in six years the whole soil is deepened and thoroughly mixed with whatever manure has been put on. This produces the same effect as trenching, and even more perfectly. The whole of the land in which the best flax grows has been so treated for several generations, and may be looked upon as a species of compost eighteen inches deep. Potatoes or colza are usually planted with a double portion of manure, after which wheat is sown, slightly manured; then rye with turnips sown the same year after the rye. These are taken up in September or October, and stored for winter use. The land has been well weeded while the turnips were growing, and all the manure is decomposed and mixed with the soil. It is ploughed in stitches before winter, some manure having been previously spread over it if necessary; and it is left exposed to the mellowing effects of frost and snow. As soon as the winter is over and the snow is melted the final preparation goes on. Deep ploughing and harrowing further divide and pulverize it: the surface is laid as level and smooth as possible; and if there is no fear of too much wet, which in this light loam soon disappears, the whole is laid flat and level as a bowling-green, or else divided into beds with water-furrows between them. On this the liquid manure is poured out, and the Dutch ashes spread if any are used, or the rape-cakes, as mentioned before. The harrows are drawn over the land, and it is left so a few days that the manure may sink in. It is then again harrowed and the linseed is sown broadcast by hand, very thick and even, about one hundred weight and a half to the acre. A bush-harrow or a hurdle is drawn over, merely to cover the seed, which would not vegetate if it were buried half an inch deep. According to the state of the land it is rolled or not, or the seed is trodden in by men, as is done with fine seeds in gardens. This is only in the lightest soils. Most commonly the traîneau is drawn over the land. This is a wooden frame with boards nailed closely over it, which is drawn flat over the ground to level and gently press it. In a short time the plants of flax come up thick and evenly, and with them also some weeds. As soon as the flax is a few inches high the weeds are carefully taken out by women and children, who do this work on their hands and knees, both to see the weeds better and not to hurt the flax with their feet. They tie coarse pieces of cloth round their knees, and creep on with their face to the wind, if possible. This is done that the tender flax, which has been bent down by creeping over it, may be assisted by the wind in rising. This shows what minute circumstances are attended to by this industrious people. The weeding is repeated till the flax is too high to allow of it.

The seed which is used is generally obtained from Riga, it being found that the flax raised from home-grown seed is inferior after the first year. But many intelligent men maintain that if a piece of ground were sown thin with linseed so that the flax could rise with a strong stem, and branch out, and if the seed were allowed to ripen, the Flemish seed would be as good as that from Riga: but it still remains to be proved whether it would be cheaper to raise it or to import it.

When the flax begins to get yellow at the bottom of the stem it is time to pull it, if very fine flax is desired, such as is made into thread for lace or fine cambric; but then the seed will be of little or no value. It is therefore generally left standing until the capsules which contain the seed are fully grown and the seed formed. Every flax-grower judges for himself what is most profitable on the

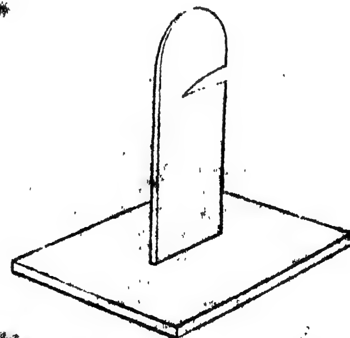
whole. The pulling then begins, which is done carefully by small handsful at a time. These are laid upon the ground to dry, two and two obliquely across each other. Fine weather is essential to this part of the operation. Soon after this they are collected in larger bundles and placed with the root end on the ground, the bundles being slightly tied near the seed end; the other end is spread out that the air may have access, and the rain may not damage the flax. When sufficiently dry they are tied more firmly in the middle, and stacked in long narrow stacks on the ground. These stacks are built as wide as the bundles are long, and about eight or nine feet high. The length depends on the crop; they are seldom made above twenty or thirty feet long. If the field is extensive several of these stacks are formed at regular distances; they are carefully thatched at top; and the ends, which are quite perpendicular, are kept up by means of two strong poles driven perpendicularly into the ground. These stacks look from a distance like short mud walls, such as are seen in Devonshire. This is the method adopted by those who defer the steeping till another season. Some carry the flax as soon as it is dry under a shed and take off the capsules with the seed by *rippling*, which is drawing the flax through an iron comb fixed in a block of wood: the capsules which are too large to pass between the teeth of the comb are thus broken off and fall into a basket or on a cloth below. Sometimes, if the capsules are brittle, the seed is beaten out by means of a flat wooden bat like a small cricket-bat. The bundles are held by the root end, and the other end is laid on a board and turned round with the left hand, while the right hand with the bat breaks the capsules, and the linseed falls on a cloth below. The flax is then immediately steeped; but the most experienced flax-steepers defer this operation till the next season. In this case it is put in barns, and the seed is beat out at leisure in winter. When flax is housed, care must be taken that it be thoroughly dry; and if the seed is left on, which is an advantage to it, mice must be guarded against, for they are very fond of linseed, and would soon take away a good share of the profits by their depredations.

Steeping the flax is a very important process, which requires experience and skill to do it properly. The quality and colour of the flax depend much on the mode of steeping; and the strength of the fibre may be injured by an injudicious mode of performing this operation. The object of steeping is to separate the bark from the woody part of the stem, by dissolving a glutinous matter which causes it to adhere, and also destroying some minute vessels which are interwoven with the longitudinal fibres, and keep them together in a kind of web. A certain fermentation or incipient putrefaction is excited by the steeping, which must be carefully watched, and stopped at the right time. The usual mode of steeping is to place the bundles of flax horizontally in shallow pools or ditches of stagnant water, keeping them under water by means of poles or boards with stones or weights laid upon them. Water nearly putrid was supposed the most efficacious, and the mud was often laid over the flax to accelerate the decomposition: but this has been found to stain the flax, so that it was very difficult to bleach it or the linen made from it afterwards. The method adopted by the steepers of Courtray, where steeping flax is a distinct trade, is different. The bundles of flax are placed alternately with the seed end of the one to the root end of the other, the latter projecting a few inches: as many of these are tied together near both ends as form a thick bundle about a foot in diameter. A frame made of oak-rails nailed to strong upright pieces in the form of a box 10 feet square and 4 deep, is filled with these bundles set upright and closely packed. The whole is then immersed in the river, boards loaded with stones being placed upon the flax till the whole is sunk a little under the surface of the water. The bottom does not reach the ground, so that the water flows over and under it. There are posts driven in the river to keep the box in its place, and each steeper has a certain portion of the bank which is a valuable property. The flax takes somewhat longer time in steeping in this manner than it does in stagnant and putrid water, and it is asserted by those who adhere to the old method that the flax loses more weight; but the colour is so much finer that flax is sent to be steeped in the Lys from every part of Flanders. When it is supposed that the flax is nearly steeped sufficiently, which depends on the temperature of the air, the flax being sooner steeped in warm weather than in cold, it is examined carefully every day, and towards the latter part of the time several times in the day, in order to ascertain whether the fibres readily separate from the wood the whole length of the stem. As soon as this is the case the flax is taken out of the water: even a few hours more or less steeping than is necessary will make a difference in the value of the flax. If it is not steeped enough, it will not be easily scutched, and the wood will adhere to it. If it has been too long in the water, its strength is diminished, and more of it breaks into tow. The bundles are now untied, and the flax is spread evenly in rows slightly overlapping each other on a piece of clean smooth grass which has been mown or fed off close. Fine weather is essential to this part of the process, as rain would now much injure the flax. It is occasionally turned over, which is done dexterously by pushing a long slender rod under the rows and taking up the flax near the end which overlaps the next row and turning it quite over. Thus, when it is all turned, it overlaps as before, but in the contrary direction. It remains spread out upon the grass for a fortnight, more or less according to the season, till the woody part becomes brittle and some of the finest fibres separate from it of their own accord. It is then taken up, and as soon as it is quite dry it is tied up again in bundles, and carried into the barn to be broken and heckled at leisure during the winter.



Frame in which the flax is packed to be steeped in the river Lys in Flanders.

In the domestic manufactures the flax is broken or scutched at home, when the weather prevents out-door work. The common brake consists of four wooden swords fixed in a frame, and another frame with three swords which play in the interstices of the first by means of a joint at one end. The flax is taken in the left hand and placed between the two frames, and the upper frame is pushed down briskly upon it. It breaks the flax in four places, and by moving the left hand and rapidly repeating the strokes with the right the whole handful is soon broken. It is then scutched by means of a board set upright in a block of wood so as to stand steady, in which is a horizontal slit about three feet from the ground, the edge of which is thin. The



Upright board to clear the flax of the wood.

broken flax held in handsful in the left hand is inserted in this slit, so as to project to the right, and a flat wooden sword of a peculiar shape is held in the right



Flat sword or scutcher.

hand; with this the flax is repeatedly struck close to the upright board, while the part which lies in the slit is continually changed by a motion of the left hand. This operation beats off all the pieces of the wood which still adhere to the fibre, without breaking it, and after a short time the flax is cleared of it and fit to be heckled. But the operations of breaking and scutching are tedious and laborious when thus executed by hand. A mill is now used (where large quantities of flax are required for manufactures), having three fluted cylinders, one of which is made to revolve by horse or water power and carries the other two round. The flax plants are passed between these cylinders while thus revolving, and the stalk, or *boon*, as it is technically called, is by this means completely broken without injuring the fibres. The scutching is accomplished in the same mill by means of four arms projecting from a horizontal axle, arranged so as to strike the boon in a slanting direction until the bark and other useless parts of the plant are beaten away. In the last process by which flax is prepared for the spinner, the *heckling*, the instrument employed, called the heckle, is a square piece of wood studded with rows of iron teeth about four inches long and disposed in a quincunx order. The fineness of the heckle is chosen with reference to the quality of the flax, and heckles differing in this respect from each other are used at different stages of the dressing, the coarsest first, and the finest to give the last degree of smoothness and finish to the flax. The operation of heckling is performed by the workman grasping a handful of flax by the middle and drawing first one side or end and then the other through the teeth of the heckle until every particle of extraneous matter is removed, and the whole of the filaments are arranged in distinct, even, and parallel fibres.

History and Trade.—Flax is found in every quarter of the globe, and has been cultivated for its fibrous stalk from the very earliest period of which we have any record. The art of preparing these fibres and weaving them into linen cloth had reached a high degree of perfection among the Egyptians so early as the time of Joseph. For some time it appears that the preparation of flaxen thread was confined to Egypt. Solomon obtained this material from that country, and linen cloths were made with it by the Jews. Herodotus tells us that linen, in his time, was obtained by the Greeks from Egypt. In every country where flax has been cultivated, with the exception of India, it has been applied to this manufacture; but among the Hindus it is grown solely for the sake of the oil expressed from its seed, the stalk, in which its chief value resides, being thrown aside by them as useless.

In the time of Pliny flax was cultivated in several parts of Europe, but it is supposed not to have been produced in England until after the Norman invasion, because it is not found among the list of *titheable* articles at that period. In 1175 it was enumerated among titheable productions. England has never grown a sufficient quantity of flax for its own use, although its cultivation was made compulsory to a certain extent by a statute passed in 1531, which required that for every sixty acres of land fit for tillage, one rood, at least, should be sown with flax or hemp-seed. It has since been attempted to give encouragement to the cultivation by public rewards or bounties. A duty was imposed upon foreign linen in 1767, and its produce was appropriated by the legislature for the encouragement of English cultivators; but so little inclined were our farmers to apply the land to this purpose that fifteen years passed without any claim having been made for the premium. The plant will grow in almost every soil, but it is a very exhausting crop, and it is therefore not surprising that the farmers should be disinclined to cultivate it while they were imperfectly versed in the art of restoring its productive quality to the land. A considerable quantity of land is now sown with flax-seed every year in Somersetshire, Lancashire, and Yorkshire: it is largely grown in Scotland, and still more so in Ireland, which island produces nearly all the flax that is used in its extensive linen manufacture. The influence of the soil shows itself more in the quality of the fibre than in the quantity produced. Where the plants grow very thickly together the stalks are very slender, and as each stalk comprises the same number of fibres, these must, under such circumstances, be finer than where the stalk is thicker.

The quantity of flax imported into and exported from the United Kingdom, and the quantity taken for the purposes of manufacture in each year, from 1820 to 1836, were as follow:—

	Imported. Cwts.	Exported. Cwts.	Taken for home use. Cwts.
1820	532,389	17,866	376,170
1821	498,554	8,773	491,582
1822	610,106	7,282	607,540
1823	553,937	9,719	553,599
1824	742,531	11,677	739,651
1825	1,055,233	7,571	1,018,837
1826	688,622	8,956	697,488
1827	907,079	6,331	896,889
1828	876,189	6,899	882,289
1829	922,040	8,580	909,709
1830	944,096	3,633	955,112
1831	936,411	10,548	918,883
1832	982,516	15,504	984,869
1833	1,129,633	18,202	1,112,190
1834	811,722	19,569	794,272
1835	740,814	12,255	728,143
1836	1,529,116	16,789	1,511,428

Up to the year 1825, the duty charged upon foreign grown flax was, when dressed, 10*l.* 14*s.* 6*d.*, and when undressed, 5*d.* per cwt. In the year just named both kinds were subjected to the same rate of duty, which was then fixed at 4*d.* per cwt.; and this rate was further reduced to 3*d.* per cwt. in 1826, to 2*d.* in 1827, and to 1*d.* per cwt. in 1828, at which nominal rate it has since been continued.

More than two-thirds of the whole quantity of flax imported come from Russia; the remainder is supplied by Prussia, Holland, and Belgium, with the exception of a small quantity brought from France.

Within the last four years, a part of the flax imported has been again exported in the form of linen yarn; and this, according to present appearances, is likely to become a considerable branch of our export trade. The quantity and declared value so exported in each year from 1832 to 1836 have been as follow:—

	Pounds.	£.
1832	110,188	8,705
1833	935,682	72,006
1834	1,533,325	136,312
1835	2,611,215	216,635
1836	4,574,504	138,772

A small part of these exports are taken by Germany; but the great bulk of the shipments are made to France, the value of the raw material having been increased by the operations of our spinning-mills at the rate of more than 100*l.* per ton. The improvements introduced into the flax-mills of this country, and which have led to the opening of the trade in question, may be explained by the fact that the length of yarn produced from a pound of flax of the average degree of fineness was, in 1814, only 3,330 yards, while the length of yarn of the average quality now produced from a pound of flax is 11,170 yards. Some yarns are now produced of a fineness much superior to this average; and it is of such fine yarns that the shipments to France consist. Flax-spinning is now carried on with most success in the West Riding of Yorkshire. Machinery for the purpose has lately been put up in Ireland; but hitherto the quantity spun has not equalled the demand of the Irish linen-weavers, for whose use large quantities are sent from England.

A considerable part of the fine yarn used by our weavers was formerly imported from Germany. This trade has of course declined since our spinners have begun to supply foreign countries. The quantity of linen yarn so brought to this country in each of the ten years preceding 1837 has been as under:—

1827	3,782,352 lbs.	1832	1,522,416 lbs.
1828	3,429,104	1833	1,564,640
1829	3,320,240	1834	1,624,448
1830	2,151,632	1835	1,378,183
1831	1,943,424	1836	589,526

FLAXMAN, JOHN. York may claim the honour of being the birth-place of this very eminent sculptor, he having been born in that city, July 6th, 1755; yet he may properly be considered a denizen of the metropolis, for he was brought to London while yet an infant not more than six months old. At that time his father, who was a moulder of figures, kept a shop in New Street, Covent Garden, and subsequently in the Strand; and it was in this humble studio that the future artist received the first impressions

of taste. In all probability it was not an unfortunate circumstance that a natural weakness of constitution and delicacy of health, which continued until about his tenth year, gave him a relish for solitary and sedentary amusement. That it was a fortunate one for him to have thus early and constantly before his eyes objects adapted to fix his feelings, and well calculated to rouse his intelligence, there can be no doubt. Seated behind the counter with paper and pencil, or with books, he studied more desultorily than would otherwise have been the case, yet perhaps more profitably and more diligently, because less compulsorily. Self-imposed tasks are but another term for enjoyments; for this reason is it that the self-taught, among whom Flaxman may to a certain extent be ranked, are generally found to apply themselves to whatever may be their pursuit with a zest and an earnestness that never accompany routine.

After the death of his mother, which occurred when he was in his tenth year, his father married a second wife, who treated young Flaxman and his brother with such tenderness as to win their affection and esteem. It was somewhere about this period that having attracted the notice of the Rev. Mr. Mathew, he was introduced by that gentleman to his wife, a lady of very superior acquirements, who took delight in making him acquainted with the beauties of Homer and Virgil, while he would attempt to embody with his pencil such poetic images or parts of the narrations as most caught his fancy. By those kind and judicious friends he was encouraged to study the original languages; and although here also he was chiefly his own tutor, he made such proficiency as enabled him to read the master poets of antiquity, if not very critically, yet with tolerable readiness; quite enough so to enter into their spirit and follow their conceptions, as is evident from his compositions after Homer and Æschylus.

Choice of profession for him there was none, both nature and circumstances having so determinedly predestined him for sculpture, that for any one to have entertained an idea of his following any other pursuit would have been absurd. Accordingly, in his fifteenth year, he became a student of the Royal Academy, and in 1770 exhibited, as his first subject there, a figure of Neptune in wax. Here, while he distinguished himself by the assiduity with which he prosecuted his studies, he received a lesson which taught him that application and enthusiasm combined are not always a match for mediocrity when backed by favour; for on his becoming a candidate for the gold medal (the silver one he had previously carried off), Reynolds, the then president, awarded the prize to Engleheart, a now utterly forgotten name. Mortified, yet not dispirited, Flaxman returned to his studies, with unabated relish, although for some time compelled to devote a considerable portion to providing for the exigencies of the passing day, which he did by designing and modelling for others, particularly for the Wedgwoods, to whom his talents and his taste were eminently useful. Moderate as was the remuneration, such employment put him at ease in his pecuniary circumstances, because he already possessed one very important fund towards pecuniary independence, namely a contented frugality and an utter disrelish of all expensive habits and amusements. And here it may be observed, that even in after-life, when he was in comparative affluence, and when his fame would have been a passport to the most brilliant circles, he continued to distinguish himself by perfect simplicity in his habits and mode of living, equally remote from affectation on the one hand and a spirit of penuriousness on the other. In this latter respect he stood in direct contrast to a contemporary artist of the chisel, whose undisguised object through life was money-making, and who was fortunate enough to amass upwards of *200,000l.*, so that he had the death-bed consolation of dying rich enough to make the world stare and talk. Very far different was the character of Flaxman: enthusiast as he was in his art, he would never have got on in it as a mere profession.

The year 1782 formed an important epoch in his life, since not only did he for the first time quit his paternal residence in the Strand, and venture to establish himself in a house in Wardour Street, but was guilty of what Reynolds at least considered the highest imprudence. 'So, Flaxman,' exclaimed the latter to him one day, 'I am told you are married,—if so, Sir, you are ruined for an artist.' Yet never was there augury less veracious than this ill-omened and rather uncourteous speech, for never was there a happier union than that of Flaxman and Ann Denman, a woman equally amiable for her virtues and her accomplishments. That the president's sinister prediction was not at all likely to be fulfilled became soon apparent by proofs of increased ability, which the artist gave in his monument of Collins the poet, and that of Mrs. Morley, in Gloucester cathedral; which latter is a work replete with that poetic simplicity and pathos which hallow so many of our artist's productions of that class. At length he determined upon visiting Italy, for which country he set out in 1787, accompanied by his wife. While he was at Rome he had an opportunity of giving proof to the world with what intellectual power and sympathy of genius an Englishman could realise to the outward sense the conceptions of a Homer, an Æschylus, and a Dante. It was for Mrs. Hare Nayler that he made a series of thirty-nine subjects from the Iliad and thirty-four from the Odyssey, illustrative of the principal events in those poems. For these compositions, so instinct with the intellectual power of art, it is said he received no more than the paltry sum of about fifteen shillings a-piece, a sum most incredibly small, amounting altogether to not more than a fashionable portrait-painter would make at a single sitting. But he was paid in worthier coin, for those productions at once stamped his reputation. Neither were they unproductive of more immediate good consequences, since they served to collect patrons around him; among the rest the Countess Spencer, for whom he composed his series of illustrations of Æschylus. He also obtained the patronage, if such it can be called, of that more eccentric than amiable character, the earl of Bristol and bishop of Derry, who had commissioned him to execute the group of Athamas, and paid him no more than *600l.* This was the sum, it is true, actually bargained for, but so inadequate to the executed work, that the sculptor must have been a positive loser by it, actually out of pocket, besides relinquishing what it would have produced him had he retained it and offered it to some other purchaser. Flaxman however was not the man to retract from his engagements: for that he was too honourable, and to complain he was too proud. During his stay at Rome he executed for the late accomplished Thomas Hope an exquisite small marble group of Cephalus and Aurora. It was for him too that he produced that third sublime series of poetic compositions, the Illustrations of Dante, amounting altogether to one hundred and nine subjects, viz. thirty-eight from the Inferno, as many from the Purgatorio, and thirty-three from the Paradiso. Here, being left almost entirely to the resources of his own imagination, without assistance from the previous ideas of other artists, he manifested still greater originality of mind and intellectual vigour than in the Homeric series, or that from Æschylus. All the three constitute an almost new province of art, combining the distinguishing qualities of picturesque and sculpturesque design.

On his return from Italy, where he had spent upwards of seven years, not quite unprofitably as regarded his pecuniary affairs, certainly most profitably as regarded both his studies and his reputation, he took a house in Buckingham Street, Fitzroy Square, and in a very short time distinguished himself by his noble monument to Lord Mansfield. It is hardly necessary to add that he now found the doors of the Royal Academy graciously open to receive him, he being unanimously elected an Associate in 1797. In that year he exhibited there his monument of Sir W. Jones, now in the chapel of University College, Oxford, and three bas-relief sketches of subjects from the New Testament, viz. Christ raising from the dead the daughter of Jairus, and two illustrative of the texts, 'Comfort and help the weak-hearted;' 'Feed the hungry.' These may be considered as the commencement of a cycle of scriptural compositions intended to show that the simple truths of the Gospel were fully capable of inspiring the sculptor and supplying him with appropriate subjects. Of this class are the reliefs of the monument of Sir F. Baring's family in Micheldean church, Hants, which expressively figure the ideas of the following sentences: 'Thy will be done'—'Thy kingdom come'—'Deliver us from evil.' To these may be added his beautiful illustration of the text, 'Blessed are they that mourn,' in a monument to Mary Lushington, of Lewisham, Kent, representing a mother sorrowing for her daughter, and comforted by an angel. His groups of 'Come, ye blessed'—'Lead us not into temptation'—'Charity,' and the monuments of Countess Spencer and Mrs. Tighe, the poetess, not to enumerate others, are also replete with religious sentiment and fervour. That he should have been

pre-eminently happy in such subjects needs not greatly excite our surprise, because he was at home in them; in them his head and hand spontaneously obeyed the dictates of a heart tenderly alive to every sentiment of devotion. Hence it was that he so successfully broke through the conventional trammels of his profession, and opened an almost entirely fresh track for himself. On the contrary, when fettered down to common-place ideas and subjects, he did not rise at all higher than many others have done. Even his monument of Nelson, as well as others by him in St. Paul's, are equally cold in conception and execution, without any indication of their having been wrought by him *con amore*. Whether he would have succeeded very much better in the colossal figure of Britannia, which he proposed should be erected upon Greenwich Hill, admits of doubt; although that he could have executed such a work can hardly be questioned. A figure, however, of such stupendous dimensions, for its height was to have been not less than 200 feet, was treated as an absurdly extravagant, if not impracticable and utterly visionary scheme, though in these days of gigantic enterprise, even if rejected as useless, it would not have startled as overpassing the bounds of feasibility.

In 1810 he was appointed to the then new professorship of sculpture at the Royal Academy, to which circumstance the world is indebted for his series of Lectures on the art, which, although of no extraordinary merit as literary compositions, are full of good sense and good feeling, and may be studied with profit, not by those alone of his own profession, but by artists and men of taste generally.

Till the year 1820 he had enjoyed the best species of prosperity which Heaven can bestow, and which those who are outwardly the most prosperous often miss altogether,—a life of serenity and tranquil competence, with constant occupation in the art he loved, and increasing fame attending it; but he was now doomed to experience a most bitter bereavement in the loss of her who had been his affectionate companion for 38 years. He henceforth felt a blank in his existence which neither the solace of friendship nor the honours of public applause could fill up. Nevertheless, so far from yielding either to despondency or to the pressure of advancing age, he still continued to apply himself vigorously to his art, and some of his very latest productions are among his very best. The shield of Achilles, first modelled in 1818, afterwards cast in silver-gilt for George IV., is certainly one of the most splendid achievements of the art in modern times. To this period belong also his Psyche, and group of the Archangel Michael and Satan, both of them stamped with his genius. So far from having lost any of its energy, his mind and hand continued active till the very last; for when prevented by indisposition from doing more, he sketched and designed on paper. The interruptions he experienced from illness or infirmity were but few and brief; and until three days before his death he continued able to employ himself in his usual pursuits and studies without particular inconvenience. That event took place on the 7th December, 1826; and on the 15th he was followed to the grave (in the churchyard of St. Giles in the Fields) by the president and council of the Royal Academy.

Whether we contemplate him as a man or as an artist, so much does he command our love and our admiration, that for want of words to do justice to his excellence, it is difficult to avoid the semblance of overstrained panegyric. In him the man exalted and seconded the artist, for in all his best productions, those which are really to be regarded as the spontaneous offspring of his own mind and feelings, the workings of a good, a pure, and benevolent spirit are as discernible as those of a great and lofty one. It must indeed be confessed that in some of the mechanical parts of his art he did not greatly excel, neither do his works display that high finishing and delicacy of execution which captivate the eye and often mislead the judgment. 'If Flaxman,' says Cicognara, 'had possessed skill in modelling and execution equal to his talent in invention and composition, he would certainly have had a great share in the prosperous revolution which has taken place in the art. Nevertheless it is greatly indebted to him, since, as far as we are acquainted with his productions, we may affirm that they have mainly contributed to awaken sculpture from a certain monotonous lethargy, and to restore the golden style—the severity of the antique—which he knew how to apply to his own designs.' This praise, if not very warm, is sufficiently discriminating and just upon the whole. It is admitted that Flaxman helped to restore the art from the imbecile inanity and soul-less though occasionally graceful mannerism into which it had fallen, and in which it appeared inclined to remain. He rendered it more poetic, taught it to address itself to the heart, to touch the noblest feelings of our nature, and, while it touched, to elevate them to that sphere of holiness where his own affections constantly abided.

FLEA. [PULEX.]

FLE'CHE, LA. [SARTHE.]

FLE'CHE, a breast-work consisting of two faces, which form with one another a salient angle. It is constructed on the exterior of the glacis of a fortress, generally in a retired part, as at the foot of the place L [*Fig.* 1, BASTION], in order to defend by its fire the ground before the bastion and ravelin.

FLE'CHIER, ESPRIT, born in 1632 at Pernes, near Carpentras, studied in the college of the 'Fathers of the Christian Doctrine,' of which congregation his maternal uncle was then the superior. Being ordained, he went to Paris, and became preceptor to a young gentleman. He made himself favourably known by writing panegyrical orations in honour of saints and also of deceased distinguished contemporaries, which were much liked at the time as specimens of eloquence. In 1673 the Abbé Fléchier was named a member of the French Academy; and in 1682 he was appointed by Louis XIV. almoner to the Dauphiness. In 1685 he was sent at the head of a mission to reclaim to Catholicism the Protestants of Poitou and Brittany. On his return to Paris he was appointed by the king bishop of Lavaur, but was soon after transferred to the see of Nismes. The revocation of the edict of Nantes, 22nd October, 1685, had been followed by a species of persecution against the Protestants, or Huguenots as they were called, who were very numerous at Nismes and in the neighbouring districts. Fléchier, who was naturally of a mild disposition, while obeying the intolerant orders of the king towards this part of the population, executed them with as much temperance as could be expected from one in his situation. His letters contain painful evidence of the oppressions and cruelties committed at that epoch. When the persecuted Protestants rose in 1702-3 against their oppressors, they fearfully retaliated by killing the Catholics and burning their churches. This was followed by Louis XIV. sending a large force under a marshal of France, and the devastation of the mountainous districts of the Cévennes ensued. Fléchier repeatedly expresses his astonishment at the boldness and courage of the victims. (*Lettre* 138, in the last volume of *Les Œuvres de* Fléchier.) Fléchier died at Nismes in February, 1710. His scattered works have been collected and published:—'Œuvres complètes de Fléchier,' 10 vols., Nismes, 1782. They consist of biographies, sermons, panegyrics, and 'oraisons funèbres,' or funeral orations, in which last he was considered to rival and almost to excel Bossuet. Cardinal Maury (*Essai sur l'Eloquence de la Chaire*, vol. i.) examines with a critical eye Fléchier's oration in honour of Marshal Turenne, which was considered as his masterpiece, and points out its defects. Fléchier wrote a life of Cardinal Ximenes, rather too partial according to some critics, and a life of Theodosius the Great. His correspondence above mentioned furnishes some interesting materials for contemporary history.

FLECKNOE, RICHARD, is said to have been a Catholic priest. He was a minor poet and wit in the time of Dryden, and would have been long since forgotten had not that writer used his name as the title of a severe satire against Shadwell, and therein proclaims that he

> 'In prose and verse was own'd without dispute
> Through all the realms of nonsense absolute.'

Of course his name was transmitted to posterity with the same ignominy that has accompanied the heroes of Pope's 'Dunciad.' The reader of satires should not however take too much for granted, nor be too ready to admit as a fact that all objects of ridicule and invective are such fools and knaves as they are represented. Party feeling and private animosity may have occasioned the attacks directed by a powerful opponent, rather than a cool judgment and a rational inquiry into merits. In the case of the satires of Pope and Dryden, the satires themselves are in the hands of every gentleman possessing a moderate library, while the works of the persons satirised are utterly unknown, excepting to those who take an active interest in studying the literature of the period. Hence a vast number of persons are

by name familiar to the mass of readers, on account of their having been by our great satirists denounced as the writers of unredeemed trash, without any opportunity being given of examining the justice of the sentence. Flecknoe, in particular, is a victim to these partial views. There is no doubt that the mere readers of Dryden take it for granted that Flecknoe was a most unqualified idiot, yet in the 'Retrospective Review' (vol. 5) there is an article which proves most satisfactorily that though he did not possess any great genius, and was sadly defective in his versification, he still possessed much fancy, and wrote some small pieces which for happy turns of thought would not disgrace even the first writers in the language. His description of 'a man troubled at nothing' (there quoted) is a masterpiece in its way.

FLEET PRISON, like the neighbouring street, takes its name from the brook or river of Fleet, which formerly ran by it, and still runs under Farringdon Street. The earliest mention of this prison is in the reign of Richard I., who, in his first year, confirmed to Osbert, brother of William Longchamp, chancellor of England, and to his heirs for ever, the custody of his palace at Westminster, with the keeping of his gaol of the Fleet in London. King John also, by patent dated in the third year of his reign, gave the archdeacon of Wells the custody of his palace at Westminster and his gaol of the Fleet, together with the wardship of the daughter and heir of Robert Leveland. (Stow, *Surv.*, edit. 1603, p. 393.)

Howard, in his *State of the Prisons in England and Wales* (4to., Warringt., 1784, p. 217), says, to this prison were committed formerly those who had incurred the displeasure of the Star Chamber; and adds that, in the 16th Char. I., when that court was abolished, it became a prison for debtors and for persons charged with contempt of the Courts of Chancery, Exchequer, and Common Pleas. But the prison of the Fleet was, in all probability, a place for debtors from its earliest existence; numerous instances to prove it so may be found through different centuries upon the rolls of parliament. Adam de Wythford, chamberlain of North Wales, was imprisoned there for debt in 1335 (*Rot. Parl.* vol. ii. p. 91); and we find a petition from one John Frauncey, a debtor confined there, A.D. 1290, 18th Edw. I. (*Ibid.*, vol. i. p. 47).

As early as the 2nd Hen. IV., A.D. 1400, it was determined by parliament that the council, with the chancellor and justices, should settle what fees the warden of the Fleet was to take (*ibid.*, vol. v. p. 110); and it was determined in the parliament of the 23rd Hen. VI. that his office was not to be prejudiced by the statute of that year touching sheriffs and gaolers.

Howard (*State, &c. ut supra.*, p. 219) has given a table of the regulations observed in the Fleet, with another of the warden's fees, as both were finally settled in Hilary Term, 1729, 3 Geo. II. (See also Neild's *State of the Prisons*, 4to., Lond., 1812, p. 218—222.)

The warden is appointed by letters patent under the great seal. He receives no salary whatever, but is wholly remunerated by the fees above-mentioned. The liberty of permitting prisoners to reside within the Rules, upon giving an indemnity against an escape, has been granted by the warden for the time being from very antient times, and the practice is expressly recognised by the statute of the 8th and 9th Will. III., c. 27. (*Return to the House of Commons relating to the Fleet Prison*, 29 *Apr.* 1830.)

Strype, in his edition of Stow, fol., Lond., 1720, b. iii. p. 280, gives the extent of what are technically termed the Rules of the Fleet. He says, 'To this prison there have been, some years since, granted Rules; which are, all the north side of Ludgate-hill, the west side of the Old Bailey unto Fleet-lane, and down the same on the south side; and so the east side of the row of houses next the Fleet, taking in all the courts and alleys within the said limits.'

This prison was burnt in the Fire of London, and again by the rioters in 1780.

FLEETWOOD, CHARLES, notorious for the active part that he took in the Rebellion, was descended from a private family in Lancashire, from which several distinguished persons had sprung. From a trooper in the earl of Essex's forces he rose to be colonel of infantry, and was made governor of Bristol. In October, 1645, he was returned to parliament for Buckinghamshire, and in 1647 was one of the commissioners named to treat with the king. At the battle of Worcester Fleetwood distinguished himself so much that he gained great favour both with Oliver Cromwell and the army in general: indeed afterwards, when the king was executed, and the parliamentary army became more powerful, he was inferior to few in the influence that he possessed among the soldiery. Fleetwood had married Frances, the daughter of Thomas Smith of Winston in Norfolk, by whom he had three children, but this lady being dead, he was fixed upon by Cromwell, from political motives, to marry Bridget, his eldest daughter, the widow of Ireton. Soon after he became his son-in-law the Protector nominated him commander-in-chief of the forces in Ireland, where he was also invested with a commissionership for the civil department. Cromwell, however, feeling that his interests were not perfectly secure in the hands of Fleetwood, who was a thorough republican, and strenuously opposed to the Protector being made king, sent his son Henry Cromwell to watch over his conduct. Some enmity was thus produced, and with the view of putting an end to it, Cromwell created Fleetwood one of the new lords, and made him the chief of the fourteen major-generals to whom the government of the nation was arbitrarily committed, and who were deputed to search for such royalists as had borne arms under Charles I., or were disaffected to the present government, with power to imprison them, and to decimate their estates. When Richard Cromwell became Protector, Fleetwood strove to obtain his title, and to supplant him in his authority; but while he was caballing against him, the nation, wearied with tumult and discord, recalled the exiled king.

At the immediate time of the Restoration it was supposed that Fleetwood would be executed as a rebel: his life was with difficulty saved, and he retired to Stoke Newington, where he was allowed to spend the remainder of his life in miserable obscurity. He died soon after the Revolution. In character he was cunning, but weak and irresolute, and of shallow capacity: he was neither generally distinguished for courage (his conduct in the battle of Worcester forms an exception), nor skilful in military operations: his influence in Cromwell's extraordinary army is attributable to the excess of his fanaticism. (Noble's *Memoirs of the Cromwell Family*, &c.

FLENSBURG or FLENSBORG, a Danish town, at the southern extremity of the Flensborg Wyck or Fiorde, an arm of the Baltic, and in the centre of the duchy of Schleswig. It lies in 54° 47′ N. lat. and 9° 27′ E. long., and is encircled by hills on the three sides facing the Fiorde. It is a pleasant well-built town, inclosed by an old wall and ditch, outside of which there are three suburbs; it contains about 1200 houses and about 16,500 inhabitants. The streets are well paved and lighted. Flensburg has three German churches and one Danish, three market-places, a town-hall, an orphan asylum, an hospital and midwifery school, public library, grammar and secondary school, several schools for the lower classes, an exchange, a theatre, a house of correction, and nine refuges for the indigent. It has several large manufactories, particularly of brandy, refined sugar, tobacco, sailcloth, soap and tallow, paper, &c. There are three shipbuilders' yards, and the people of the town are owners of between 200 and 300 vessels. There is a good harbour, deep enough for large ships, but the entrance is difficult. Fairs for grain, cattle, horses, &c. are held periodically. The trade is considerable, and the exports are brandy, corn, hides and skins, soap, tallow, fish, &c. Flensburg is the capital of the bailiwick of the same name, which has an area of about 336 square miles, divided into five herreders or hardes, with one town, one market-town (Glücksburg), 29 parishes, and about 39,000 inhabitants.

FLETA is a commentary in Latin on the entire body of the English law, as it stood at the time when the author wrote. It is supposed to have been written about the thirteenth year of the reign of Edward I., as the statutes passed towards the end of his reign are not noticed, while that of Westminster II. is often quoted. The author gives as the reason for the title of his book, that it was written during his confinement in the Fleet Prison: who he was is not known. The work is divided into six books: the first treats of the rights of persons and of pleas of the crown; the second of courts and offices; the third of methods of acquiring titles to things; the fourth and fifth of actions grounded upon a seisin, and of writs of entry; the sixth of a writ of right. The author has followed Bracton in the matter and manner of his work, having adopted his plan, and in many instances transcribed whole pages from him. He also followed Glanville in many instances; and various

obscure passages of both those writers are illustrated by Fleta. It seems to have been the author's design to give a concise account of the law as it then stood, with the alterations which had taken place since Bracton wrote, supplying such parts as had been left untouched by him, and dilating upon others which had been passed over with too little attention. Thus Fleta serves as an appendix, and often as a commentary, to Bracton. Most of the subjects so minutely discussed by Bracton are passed over in Fleta in a very brief manner, so that with all its new matter this volume is not more than one-third the size of Bracton. (2 Reeve's *Eng. Law.*)

The work was originally published by Selden from an antient manuscript in the Cottonian Library, together with a small treatise in law French, entitled 'Fet Assavoir,' which is a collection of notes concerning proceedings in actions, and a learned dissertation by Selden himself. Two editions only have been published in England, one in 1647, the other in 1685, which last corrects many hundred errors which had been caused in the first edition by an unskilful copyist (Bridgman). It is also printed in Houard's collection. [BRITTON.] President Hénault, in his 'Chronological Abridgment of the History of France,' tome i., p. 258, refers to Fleta as an historical authority.

FLETCHER, JOHN, was born in 1576, and was the son of the Rev. Dr. Fletcher, afterwards bishop of Bristol. He was educated at Cambridge with his friend Francis Beaumont, and is said to have distinguished himself as a good scholar. For an account of his works and his literary connexion with Beaumont, see that article. He was carried off by a plague which happened in 1625.

FLETCHER, GILES and PHINEAS, were the sons of Dr. Giles Fletcher, who was employed by Queen Elizabeth as ambassador in Russia, and cousins of John Fletcher the dramatist.

Giles, the elder, was born about 1580, was educated at Trinity College, Cambridge, and died at his living of Alderton, in Suffolk, in 1623. The single poem which he has left, 'Christ's Victory in Heaven, Christ's Triumph on Earth, Christ's Triumph over Death, Christ's Triumph after Death,' will, as Dr. Southey observes, 'preserve his name while there is any praise.' Its beauty is of a very peculiar cast, uniting many of Spenser's characteristics with a greater regard to antithesis. Lines like the following,

> 'The obsequies of him that could not die,'
> 'And death of life, end of eternity,'
> 'How worthily he died that died unworthily,' &c.,

occur perpetually, and give an air to his poetry which cannot be well mistaken. The 'Wooing Song,' in the second part of the poem, is as perfect a specimen of fanciful elegance as can be found; and is the more striking from being written in octo-syllabic couplets, while the rest of the poem is in a variation of the Spenserian stanza.

Phineas Fletcher, younger brother of Giles, was born about 1584, and admitted scholar of King's College, Cambridge, in 1600. In 1621 he was presented to the living of Hilgay, in Norfolk, where he died about 1660.

He wrote, in addition to his great work, some Eclogues; a 'History of the Founders and Benefactors of Cambridge University,' in Latin hexameters, and a drama called 'Sicelides.' But the only work for which he is now known is 'The Purple Island, or the Isle of Man,' a description of the human soul and body, but especially the latter, much in the style of 'Christ's Triumph.'

The two Fletchers, with Browne, make up a kind of Spenserian school, possessing considerable common resemblances, with original qualities enough to procure for each a very high reputation. They are the more remarkable as having tended to form the style of Milton's poetry, as may be seen by any one well acquainted with both.

(Southey's *British Poets*; Chalmers's *Biogr. Dict.*)

FLETCHER, ANDREW, was the son of Sir Robert Fletcher, of Saltoun, in East Lothian, where he was born in 1653. Sir Robert is said to have died when his son was a child. He is, we suppose, the subject of a small duodecimo volume printed at Edinburgh in 1665, and entitled 'A Discourse on the Memory of that rare and truly virtuous Person, Sir Robert Fletcher, of Saltoun, who died the 13th of January last, in the 39th year of his age; written by a Gentleman of his acquaintance.' It is a warm tribute to the general worth and especially to the piety of his character. Andrew Fletcher's early education was superintended by Gilbert Burnet, afterwards the celebrated bishop of Salisbury, who was at this time parish minister of Saltoun. To him Fletcher was probably indebted for his first bias in favour of those political principles to which he adhered through his life. Under the care of Burnet he also laid the foundation of an excellent literary education. When he grew up he spent some time in travelling on the continent. On his return home he obtained a seat in the Scottish parliament as commissioner, or member, for his native county; and in that capacity he soon became distinguished as one of the foremost opponents of the government. After some time however he deemed it prudent to withdraw to Holland; on which he was summoned before the lords of the council, and, when he did not make his appearance, was outlawed, and his estate confiscated. He ventured to come home in 1683, but soon returned to the continent, and there he remained till 1685, when he thought proper to engage in the attempt of the duke of Monmouth. But he had scarcely landed in England when he shot a man dead in a private quarrel, and found himself obliged precipitately to leave the country. The person he killed was the mayor of Lyme. He then proceeded to Spain, and afterwards to Hungary, where he took part in some military operations against the Turks, and distinguished himself by his gallantry. When the scheme of the English Revolution began to be projected, he repaired to Holland to join the councils of his countrymen there; and he came over to England with the Prince of Orange and his old friend Burnet in 1688. He now recovered possession of his estate, and again sat as representative for his native county, first in the Scottish Convention and afterwards in parliament. After a short time however he became nearly as determined an opponent of the government of King William as he had formerly been of that of Charles II. His last exertions as a public man were directed against the scheme of the union of the two kingdoms. He died in London in 1716. He is the author of the following tracts, all of which, we believe, were originally published without his name:—1, 'A Discourse of Government with relation to Militias,' Edinburgh, 1698; 2, 'Two Discourses concerning the Affairs of Scotland, written in the year 1698,' Edinburgh, 1698; 3, 'Discorso delle Cose di Spagna, scritto nel mese di Luglio, 1698,' Napoli, 1698; 4, 'Speeches by a Member of the Parliament which began at Edinburgh the 6th of May, 1703,' Edinburgh, 1703; 5, 'An Account of a Conversation concerning a right Regulation of Governments for the Common Good of Mankind; in a Letter to the Marquis of Montrose, the Earls of Rothes, Roxburgh, and Haddington, from London, the 1st of December, 1703,' Edinburgh, 1704. The original editions of these publications are scarce, but they were all reprinted at London in an octavo volume in 1737, under the title of 'The Political Works of Andrew Fletcher, Esquire.'

Fletcher writes in a flowing and scholarlike style, occasionally rising to considerable warmth and energy; his compositions are interspersed with many sagacious and happily expressed remarks, and they have at all times the charm of earnestness and perfect conviction. But for deep or extensive views in the philosophy of politics they will be searched in vain. The author's prescriptive name of patriot best describes what he was. He was thoroughly honest, in the sense of being inaccessible to any seduction which appealed openly to his individual interests, and was always ready to make any sacrifice and to encounter any danger in the cause of what he deemed the public welfare and in the performance of his duty. But his politics, to say the truth, were made up rather more of passion than of philosophy. His two cardinal principles were an enthusiasm in behalf of the independence of his native country, and an extreme sensitiveness to the mischiefs or dangers of arbitrary power, which was however in great part an impulse of his physical organization, and which also, we are compelled to add, had not a little of the narrowness and blindness as well as the warmth and honesty of a passion—allowing him to employ the same eloquence in which he, in one place, denounces the oppression of kings, to urge in another the strange scheme of providing for the poor by the restoration of some such system of slavery as he conceives existed among the Greeks and Romans. This singular proposal is contained in his Two Discourses on the affairs of Scotland. Among the most curious of his works is his account of the Conversation on Governments, which appears to be a report of a real conversation, the parties being Fletcher himself, the earl of Cromarty, Sir Edward

Seymour, and Sir Charles Musgrave. The part of the dialogue given to Seymour in particular is highly characteristic. It is in this production that we find the remark so often quoted about the superior influence and importance of the national ballad-maker to the national law-giver: Fletcher gives it as the observation of a friend.

In a quotation prefixed to the collected edition of his works, from 'a MS. in the library of the late Thomas Rawlinson, Esq., entitled Short Political Characters of the chief of the Lords and Commons of England,' &c., Fletcher is described as 'a low thin man; of a brown complexion; full of fire; with a stern, sour look; and fifty years old.' Having mentioned his strong jealousy of the power of princes, the writer says, 'This made him oppose King Charles, invade King James, and oppose the giving so much power to King William, whom he never would serve; nor does he ever come into the administration of this queen, but stands up a stout pillar for the constitution of the parliament of Scotland.' It is added, 'His thoughts are large as to religion, and could never be brought within the bonds of any particular sett.' In the Memoirs of Lockhart of Carnwath (2nd edit. 8vo. Lon. 1714), Fletcher is described as 'so extremely wedded to his own opinions, that there were few he could endure to reason against him.' He therefore never could be brought to act with any party. 'He was, no doubt,' continues Lockhart, 'an enemy to all monarchical governments, at least thought they wanted to be much reformed; but I do very well believe his aversion to the English and the Union was so great, in revenge to them he would have sided with the royal family.' Notwithstanding his democratic opinions, 'he liked,' it is added, 'commended, and conversed with, highflying Tories, more than any other set of men, acknowledging them to be the best countrymen, and of most honour, integrity, and ingenuity (ingenuousness).' The truth is, his liberalism, or republicanism, was of a strongly aristocratic complexion. He was by temper, as well as by station, a patrician, and that too, on the whole, rather of the feudal than of the old Roman stamp. However, the general bearing of his writings, as well as of his public life, may be considered as placing him among the British democrats; and his talents, and the value of what he has left, make him a figure of considerable note among his contemporaries. The best qualities of his writings are their cordiality and straightforwardness; he has the advantages, and also the disadvantages, of the man who has never changed his opinions, and who has never doubted;—extreme confidence and a fervid zeal, but little largeness of view, and a tendency to intolerance, which even the most liberal principles cannot redeem from the charge of illiberality and bigotry. There is a very eulogistic account of Fletcher by the late earl of Buchan, in a publication entitled 'Essay on the Lives and Writings of Fletcher of Saltoun, and the Poet Thomson,' 8vo. 1792. A nephew of Fletcher's, of the same name, was an eminent judge of the Court of Session from 1726 to 1775, by the title of Lord Milton. He was also a native of Saltoun, which, besides its connexion with the Fletchers and Bishop Burnet, has likewise the honour of being the birth-place of the greatest of the old Scottish poets, Dunbar.

FLEUR-DE-LIS, a term of blazonry for the flower which resembles an iris, and which, previously to the French Revolution, was borne first semée, and then three, as representing semée, in the arms of France. In old English it was called the *flower-de-luce*. Its origin and history have been variously stated by the French antiquaries. Some have considered it as the flower which grew on the banks of the river Lys, which separated Artois and France from Flanders; others state that Louis VII., who began his reign in 1137, first adopted it in allusion to his name of *Loys*, and because he was called *Ludovicus Florus*, or the Young. The coins of Louis VII. are allowed to be the first on which the *fleur-de-lis* appears, as well as upon his smaller or counter seal. The *fleurs-de-lis* were originally borne semée, without regard to number: according to common belief Charles VI. was the first of the French monarchs who reduced them upon his shield to three. Le Blanc, however, remarks that three fleurs-de-lis only occur upon the seal of Philip de Valois, as well as upon an impression of a seal of John king of France appended to a charter of 1354. Much upon the history of the fleur-de-lis may be seen in Furetière's *Dictionnaire Universel*, tom. iii., fol. Haye, 1727, v. 'Lis;' and more especially in Rey's *Histoire du Drapeau, des Couleurs, et des Insignes de la Monarchie Française*, 8vo., Par. 1837, tom. ii. p. 59–414. Upon crowns and the tops of sceptres the *fleur-de-lis* was used by other nations as well as France from a very early period.

FLEURY, ANDRE' HERCULE DE, CARDINAL, was born in 1653 at Lodève, in Languedoc, studied at Paris in the college of the Jesuits, was afterwards made almoner to the queen-consort of Louis XIV., and in 1699 bishop of Fréjus, which see he resigned in 1715, on account of ill health. Louis XIV. appointed him also preceptor to his grandson, afterwards Louis XV., who became greatly attached to him. After the death of the regent in 1723, Fleury was made a member of the Council of State, and afterwards prime minister, in which office he continued for seventeen years, till the time of his death. The period of his administration was the happiest part of the reign of Louis XV. Fleury was honest, economical, disinterested, a friend to peace, and a patron of learning. He was obliged, against his inclinations, by the court party and Marshal Villars, to take a part in the war of the Polish succession in 1733, in which France engaged chiefly in order to support Stanislaus Leczinsky, father-in-law of Louis XV. Although that object was frustrated by the united forces of Austria and Russia, yet the war terminated in 1736 in a manner advantageous to France, which gained by it the important accession of Lorraine.

In 1741 Cardinal Fleury found himself driven by court influence into another war, that of the Austrian succession, of which he did not live to see the end. He died in 1743, at eighty-nine years of age, and from that time the government of Louis XV. fell deeper and deeper into corruption and decay. Fleury amassed no fortune, but he left the reputation of a wise, benevolent, and faithful minister of state. He completed the building for the royal (now national) library, which he enriched with a number of valuable MSS., especially in the oriental languages.

FLEURY, CLAUDE, ABBE', was born at Paris in 1640, and died in 1723, aged eighty-three years. All the contemporary writers coincide in the opinion that Fleury possessed all the virtues and qualities requisite to constitute a scholar, an honest man, and a Christian. Having completed in a brilliant manner his studies at the college of Clermont at Paris, he embraced, in 1658 the profession of his father, who was a distinguished advocate, and he practised at the bar for nine years. To his legal occupations he united the study of literature and history, but the religious turn of his mind having induced him to enter the church, he thenceforward entirely devoted himself to the study of divinity, the Holy Scriptures, canon law, and the Fathers. In 1674 he was appointed tutor to the princes Conti, whom Louis XIV. educated with his son the Dauphin. After that the king intrusted him with the education of his natural son the prince of Vermandois. Upon the death of the young prince, Louis conferred on Fleury the abbey of Loc-Dieu, in the diocese of Rhodez, and five years after (1689) he was created sub-preceptor of the king's grandsons the dukes of Bourgogne, Anjou (afterwards Philip V., king of Spain), and Berri. Fleury thus became the associate of Fenelon. In 1696 he succeeded Labruyère as member of the French Academy, and when the education of the three above-mentioned princes was completed (1707), the king bestowed on him the priory of Argenteuil, in the diocese of Paris. This grant was very acceptable to Fleury, as it afforded him a comfortable retirement for the prosecution of his studies, without depriving him of those resources which are found only in a capital. Being however a strict observer of the canon law, which was the particular subject of his study, and which prohibits a plurality of ecclesiastical benefices, he resigned the abbey of Loc-Dieu. In his retirement at Argenteuil, notwithstanding his advanced age (he was now sixty-six years old) he conceived the plan of his grand work the 'Ecclesiastical History,' and began the execution of it. After the death of Louis XIV. (1716), the Regent Duke d'Orleans nominated Fleury confessor to the young king Louis XV., a post which he held till 1722, when he resigned it on account of his great age, being then in his eighty-third year. He died a few months afterwards.

Fleury commenced his literary career with the 'Histoire du Droit François,' 1674. He afterwards published successively 'Institution au Droit Ecclésiastique,' 'Catéchisme Historique,' translated into Latin by the author himself, a work which has become classical, and is con-

stantly reprinted; 'Les Mœurs des Israelites,' of which an English translation was made by Dr. Adam Clarke. Bishop Horne calls this work 'an excellent introduction to the reading of the Old Testament, which should be in the hands of every young person;' 'Les Mœurs des Chrétiens,' also translated into English. These two last works are considered, for elegance and precision of style, as among the best in the French language. He also wrote 'Traité du Choix et de la Méthode des Etudes.' But the most valuable of Fleury's works, and that which has established his reputation as a first-rate writer, is the 'Histoire Ecclésiastique.' It comprehends a space of fourteen centuries, beginning with the establishment of Christianity, and terminating at the opening of the council of Constance. It was objected to the author that he related too many miracles, but he excused himself on the ground that such was the belief of the church to which he belonged. Though an orthodox Roman Catholic priest, he strictly adheres to the truth in his account of the scandals which have thrown odium on the church, and the best proof of his sincerity is that his 'Ecclesiastical History' was put into the Roman Index Expurgatorius. Fleury was engaged on the 20th volume of his History at the time of his death. It was continued till the year 1698 by Fobre, of the Oratoire, in 16 vols. in 4to. Fleury's 'Ecclesiastical History' is translated into English. The university library of Cambray contains a manuscript of a 'History of France,' which Fleury drew up for the use of the French princes while he was engaged with their education, but it has never been printed. We must not omit to mention, that, notwithstanding his grave occupations, Fleury had leisure to compose a treatise on the duties of masters and servants. This little work, which has been much esteemed, is translated into English.

FLEXURE, CONTRARY. A point of contrary flexure in a curve is that at which the branch of the curve ceases to present convexity to a straight line without it, and begins to present concavity, or vice versâ. [CURVE.] But when a straight line passes *through* a point of contrary flexure, the curve presents either convexity on both sides or concavity on both sides.

The algebraical test of a point of contrary flexure is a change of sign in the second differential coefficient of either of the two, abscissa or ordinate, with respect to the other. It is frequently stated, in works on the differential calculus, that the sole test of such a point is $\frac{d^2y}{dx^2} = 0$, where x and y are the abscissa and ordinate. This is not correct; the above equation may be true when there is no contrary flexure, and there may be contrary flexures when the above is not true. It is necessary and sufficient for a point of contrary flexure that $\frac{d^2y}{dx^2}$ should change its sign, which cannot be except when it is nothing or infinite. Examine therefore all the roots of the two equations,

$$\frac{d^2y}{dx^2} = 0 \qquad \text{and} \qquad \frac{1}{\frac{d^2y}{dx^2}} = 0$$

and such of them as are accompanied by change of sign give points of contrary flexure.

For instance, let the equation of the curve be

$$y = 3x^5 - 20x^4 + 50x^3 - 60x^2$$

$$\frac{d^2y}{dx^2} = 60\,(x^3 - 4x^2 + 5x - 2) = 60\,(x-1)^2\,(x-2)$$

then $\frac{d^2y}{dx^2} = 0$ when $x = 1$ and when $x = 2$. but there is only a point of contrary flexure when $x = 2$, for when $x = 1$ there is no change of sign.

FLIBUSTIER. [BUCCANEERS.]

FLINDERS, MATTHEW, was a native of Donington, in Lincolnshire. He went early to sea in the merchant service. In 1795 he was a midshipman in the Royal Navy, and went to New Holland with the ship that conveyed Captain Hunter, the new governor, to Botany Bay. On board this ship he found a congenial mind in George Bass, the surgeon, who, like himself, was bold and adventurous, and had a passionate desire to explore new countries. Soon after their arrival at Port Jackson these enterprising young men launched a little boat, which was appropriately called 'Tom Thumb,' being only 8 feet long. In this boat Flinders and Bass, with no other companion than a boy, ran across Botany Bay, and explored George's River 20 miles beyond the point where Governor Hunter's survey had stopped. They made several discoveries and encountered many dangers. Their heroism was appreciated but by few persons in the colony. The English had been ten years in possession, and there was an imaginary line of more than 250 leagues (beginning in the vicinity of the colony) set down on the charts as 'unknown coast.' Flinders was anxious to remove this blot. The complete examination of Australia became what he called his 'darling object.' It was not yet known that Van Diemen's Land was a separate island; the existence of a strait dividing it from Australia was first mentioned as a probable fact by Bass, who ran down the coast in a whale-boat, and who suggested that the heavy swell which rolled in from the westward could be produced only from the great Southern Ocean. Flinders was sent with his old companion Bass to ascertain this fact. They embarked in the 'Norfolk,' a large decked boat built of the excellent fir of Norfolk Island; and they had only six men to assist them. They went through the straits, made a rapid survey, and returned to Port Jackson in little more than three months. The name of Bass was given to this strait. In the following year, 1799, Flinders, now a lieutenant in the Royal Navy, was sent in the same small vessel to explore the coast to the north of Port Jackson, where nothing had been done since the imperfect notices by Cook. He visited and examined all the creeks and bays as far north as 25°, paying particular attention to Harvey's Bay, and returned to Port Jackson with satisfactory accounts. On his return to England he was promoted*.

In July, 1801, Captain Flinders sailed from England in the Investigator, a bark of 334 tons, carrying 88 men, including an astronomer, a naturalist, two painters, a botanic gardener, and a miner. England and France were at war at the time, the preliminaries of the treaty of Amiens not being signed until the 25th of October following; but a French pass, conceived in flattering terms, and speaking of the sacred rights of science, was granted to Flinders, who, whether in war or peace, was to be respected by all armed ships of France, and to be entertained as a friend in any French colony that he might make. Such conditions, though not expressly laid down, had been acted upon by the French in the time of Louis XVI.; and about a year before Captain Flinders's departure the English government had regularly established a precedent. M. Otto, in the name of Bonaparte, applied for a similar free pass in favour of Captain Baudin, who, it was said, was going with two ships on a voyage of discovery 'round the world;' and the Addington administration readily and courteously granted it, notwithstanding the fierce hostilities which were then raging between the two nations.

In the month of December Captain Flinders made Cape Leuwen, on the south-east coast of Australia; and commencing operations, he gradually surveyed and examined the coast to the eastern extremity of Bass's Straits, where, in 'Encounter Bay,' he met the French ships, which, instead of going round the world, had made straight for Australia, and devoted their whole care to the examination of Van Diemen's Land and New South Wales, evidently with a view to the formation of a French colony. Captain Baudin had had the start of Flinders by nine months; but he had been delayed in collecting shells and catching butterflies, and at the moment of their meeting he had done little in the way of discovery or survey; and Flinders says that by assiduity and favourable circumstances he had anticipated him in the most interesting parts of the southern coast. He says that he gave Baudin an account of his discoveries. Baudin afterwards said that he found Captain Flinders not very communicative, but that he *obtained intelligence of all that had been done on the southern coast from some of his people.* From Bass's Straits Flinders sailed to Port Jackson, where he arrived on the 9th of May, 1802. Having refitted, he set off again on the 22nd of July. He then steered northerly along the east coast, exploring Northumberland and Cumberland Islands, and surveying the great Barrier Reef of coral rocks—a long and dangerous tract, most necessary to lay down. In fourteen

* It appears that Bass met with no reward whatever. In 1802 he left Port Jackson as mate or master of a trading vessel, and was never more heard of. In 1820 there was a vague report that he was alive and settled somewhere in Peru; but the more probable story is that he was lost at sea.

days he conducted the Investigator through these perilous mazes, where he had nothing to guide him but his own vigilance and skill; then bearing still north, he made Torres Straits and surveyed the vast gulf of Carpentaria, which had been very imperfectly examined by General Carpenter, its first discoverer. While engaged in this duty the Investigator was reported to be 'quite rotten,' and in such a state that she could not possibly last above six months *in fine weather*. Three of these months Flinders kept her in the gulf; he then stood away for the island of Timor, where he refreshed his sick and over-fatigued crew. From Timor he made his way with the leaky bark to Cape Leuwen. Sailing again along the southern coast, he anchored in the Archipelago of the Recherche; then passing Bass's Straits a second time, he made for Port Jackson, where he arrived on the 9th of June, 1803, having lost many of his best men, and among others Good, the botanical gardener. The Investigator was immediately condemned: she was in such a state that people could scarcely conceive how she had been kept afloat.

Unable to continue the survey (there being no disposable vessel in the colony), Captain Flinders embarked as passenger in the Porpoise, a store-ship, in order, he says, 'to lay his charts and journals before the Lords Commissioners of the Admiralty, and obtain, if such should be their pleasure, another ship to complete the examination of the Terra Australia.' The Porpoise was accompanied by two trading vessels, the Bridgewater, Captain Palmer, and the Cato, of London. The route chosen was by Torres Straits. On the 17th of August, at night, the Porpoise suddenly found herself among breakers, and the very next instant 'striking upon a coral reef, she took a fearful heel over her larboard beam-ends.' A minute or two after, the Cato struck on the same reef, about two cable lengths off, and went over. The Bridgewater, which was close by, cleared the rocks, and was perfectly safe in smooth water; but Palmer basely 'bore away round all,' and then pursued his course without doing so much as sending a boat to ascertain the fate of the two crews*. As morning dawned Flinders, who acted with admirable self-possession, contrived to get the men safely landed on a sand-bank, which at all stages of the tide remained a little above water-mark. They removed some portion of the stores from the wrecks, and made themselves as comfortable as men could be in such a situation. There is scarcely a more interesting case of shipwreck upon record; and the methods adopted, and the admirable order preserved, show that there was a master-mind among them. On the 26th of August Flinders left the reef in a small open boat, to make a voyage of 750 miles. He however got safely to Port Jackson on the 6th September, and procured a small schooner, the Cumberland, which was only twenty-nine tons, and when she got to sea it was found that she was very leaky. She was accompanied as far as the wrecks by another schooner, and by a trading vessel which was bound for China. Flinders reached the reef on the 7th October, and was received with three cheers. In the mean while the poor sailors on Wreck Reef Bank had planted oats, maize, and pumpkins, and the young plants were up and flourishing. Captain Flinders regretted that he had no cocoa-nuts with him to plant on the bank. Some of the men went back to Port Jackson in the schooner, some embarked in the trading ship bound for China, the rest cheerfully remained with Flinders, to make, in the ill-conditioned Cumberland, which was not quite so large as a Gravesend sailing boat, the circumnavigation of half the globe; for Flinders intended to reach England with this miserable craft. He mentions that not a man refused to share the risk with him except his clerk. Having gone through Torres Straits, and touched again at Timor, Flinders stretched boldly across the Indian Ocean, and made the Isle of France, which was not yet taken by the English. Though the war had been renewed, he relied on his French pass, and indeed he could scarcely choose, for the little Cumberland was in a sinking state when he got her into the French port. To his astonishment the authorities of the Isle of France seized the vessel and all his papers, and declared him and his people to be prisoners of war. The governor even chose to consider Flinders as a spy, and treated him with a brutal severity which, united with his uneasiness of mind, certainly had the effect of shortening his valuable life. Flinders knew that Baudin was returning to France, and he saw with a prophetic eye that the Frenchman would claim the merit of all his discoveries on the southern coast of Australia. He thought the governor De Caen too illiterate to know or care much about the matter, otherwise, he says that he should have been induced to suspect that he was detained a prisoner in order that Baudin might have the start of him in publishing, and make the world believe that it was to the French nation alone they were indebted for the complete discovery and examination of those parts. Some English writers did not hesitate to take this view of the case, and what followed in France settled the question. A volume and an atlas were published: the whole of the southern coast, including not only all the discoveries of Flinders and Bass, but also those of Nuyts, Vancouver, Grant, and Dentrecasteaux, was laid down as new land, and called *Terre Napoleon*. Every point which had been named by Flinders and his precursors was rechristened, and there were all sorts of significant names given, from Cape Marengo and Cape Rivoli, to Talleyrand Bay. Baudin had made about 50 leagues of real discovery; he claimed or seemed to claim nearly 900 leagues.

After pining six years a prisoner in the Isle of France, Flinders was liberated, and he reached England at the end of the year 1810. His charts and plans were restored to him, but one of his log-books was kept or destroyed. His health was completely broken, but as long as there was work to do he kept up his energy, correcting his maps, and writing out his descriptions. After revising his last sheet for press he drooped; he died in the month of July, 1814, on the very day his book was published. (*A Voyage to Terra Australia, &c., in the years* 1801, 1802, *and* 1803, *in H.M. Ship Investigator, and subsequently in the armed vessel Porpoise and Cumberland schooner*, 2 vols., with Atlas, London, 1814; also *Quart. Rev.*, vol. xii.)

* It is worth while remarking, that the crews of the Porpoise and Cato got safely home, after all their dangers; and that Palmer and the whole crew of the Bridgewater perished at sea, on the homeward voyage.

FLINT, a well-known silicious mineral, the true native place of which is the upper bed of the chalk formation, where it occurs in regular beds, consisting either of nodules or flat tabular masses, which may be seen extending two miles in length in the chalk east of Dover. It is often found in the form of sponges, alcyonia, echinites, &c; it occurs also plentifully in alluvial deposits in the neighbourhood of chalk. Gravel consists principally of flints which have been rounded by attrition, and by exposure to air and moisture, have acquired a yellowish red colour, owing to peroxidizement of the iron which they contain; in this state they are termed ferruginous flints.

Flint is usually of a grey colour of various shades; sometimes it is brown, black, yellow, or red; hardness 7·0, 7·25; it is rather harder than quartz, which it scratches; thin fragments of the black varieties are translucent; the fracture is perfect, and large conchoidal; it is fragile, and being rarely laminated, it is broken with equal facility in almost every direction, and the fragments are sharp. Specific gravity 2·594. It is infusible, but becomes opaque and white by the action of heat.

According to Klaproth, flint consists of—

Silica	98
Lime	·5
Alumina	·25
Oxide of iron	·25
Water	1
	100

The substances with which it is mixed are to be considered as mere accidental admixtures.

Flints are largely employed under the name of gun-flints, and in the manufacture of china and porcelain; formerly, also, as the name indicates, in making flint-glass; but for this purpose fine silicious sand is now generally substituted.

FLINT, a town in North Wales. [FLINTSHIRE.]

FLINT-GLASS. [GLASS.]

FLINTS, LIQUOR OF, is a solution of flint or silica in the alkali potash; it is prepared by fusing together a mixture of four parts of hydrate of potash and one part of powdered flint or fine sand. When a part of the fluid compound is poured out of the crucible, crystals are formed in the residual portion, which, according to Berzelius, are composed of one equivalent of each of its constituents. This compound, sometimes called silicate of potash, silica being regarded as an acid, is soluble in water, and when sulphuric, nitric, or other powerful acids are added to it, hydrate of silica is precipitated.

FLINTSHIRE, a county in North Wales, in the north-eastern part of the principality. The main portion of the county extends along the æstuary of the Dee, and there are two outlying portions. 1. The main portion approximates in form to a parallelogram, having its greatest extent or length from north-west to south-east. The north-west side from the mouth of the Clwyd to the Point of Air (eight miles long) is washed by the Irish Sea; the north-east side from the Point of Air to Dodleston Common (twenty-two miles) is for the most part washed by the æstuary of the Dee, and partly bounded by the county of Chester; the south-east side (ten miles) is bounded by the county of Denbigh, from which it is partly separated by one of the branches of the Alen; the south-west side (twenty-three miles) is bounded by the county of Denbigh, the boundary line being partly along the hills which skirt on the east the valley of the Upper Alen, partly along those which skirt on the north-east the vale of Clwyd, and partly along the Clwyd itself to its outfal. 2. The principal outlying portion is also a parallelogram, having its greatest length from west-north-west to east-south-east. It is bounded on the north-north-east side (seven miles long) by the county of Chester, from which it is separated by the tributary waters of the Dee; on the east-south-east and south-south-west sides (seven miles and nine miles respectively) by the county of Salop; and on the west-north-west side (five miles) by Denbighshire, from which it is separated by the Dee. 3. The smaller outlying portion is situated between the main portion of the county and the larger outlying portion: it is bounded on every side by Denbighshire, and is very small. The area of the county is only 244 square miles; it is the smallest county in Wales: in population it is the eighth of the Welsh counties, the inhabitants in 1831 being 60,012, or 246 to a square mile. In density of population Flintshire far exceeds any other part of Wales, and is just equal to the English county of Somerset. Mold, the county town, is about 174 miles in a direct line north-west of St. Paul's, London.

Coast, Surface, and Hydrography.—The only promontory on the coast is the Point of Air. The coast is low, and is skirted in almost every part by sands, Hoyle sands and Bog sands, in some places near four miles wide, and dry at low water, except where they are traversed by the low water channel of the Dee, and of the various streams that flow into that river or into the open sea. On the north-west coast are several pools, called Trewyn pools, forming a line along the shore of about two miles.

There are no hills in Flintshire of great elevation: the south-west boundary lies along the hills which skirt the valleys of the Upper Alen and the Clwyd; and a range of hills connected with these extends through the county from north-west to south-east, separating the Alen and the lower part of the Clwyd from the æstuary of the Dee. Garreg Mountain, towards the north-west extremity of this range, is 835 feet high, and Gwaunysgaer Down, still farther to the north-west, is 732 feet high. From the slopes of this range of hills a number of small streams flow, on one side into the Dee, and on the other into the Clwyd and Alen. These rivers, though they have part of their course on or within the border of Flintshire, rather belong to other counties. [CLWYD; DEE; DENBIGHSHIRE.] The new channel of the Dee below Chester is indeed for the most part within the county, and constitutes the only inland navigation which it possesses. There is a small rail-road from the coal-pits near Mold to the Dee.

Geological Character.—The new red sandstone or red marl, the uppermost of the rocks of this county, occupies the two outlying portions; and is found on the north-west coast, in the lower part of the vale of Clwyd, and in that part of the county which is on the north-east side of the new channel of the Dee. The coal-measures occupy the coast of the æstuary of the Dee, and the coal-field forms a belt extending from the Point of Air to the south-east side of the county, gradually increasing in width inland. The seams of coal are of different thickness, from three quarters of a yard to five yards, and the dip varies from one yard in four to two in three. Common, cannel, and peacock coal are found. Pits are worked in the neighbourhood of Holywell, and at Mostyn, which is on the æstuary of the Dee, not far from that town; in the neighbourhood of Hawarden, and between that town and Flint; and also in the neighbourhood of Mold, and between Mold and Hawarden. Beds of shale and sandstone, answering in position and character to the shale and millstone grit of Derbyshire [DERBYSHIRE], underlie the coal-measures, and crop out from beneath them on the south-west side of the coal-field, forming a belt more inland than the coal-field, but parallel to it and to the shore of the Dee, and separating the coal-field from the district occupied by the carboniferous or mountain limestone. This last-named rock occupies all the remainder of the county, except a small tract occupied by the old red sandstone: extensive lead mines are worked in the limestone, especially in the neighbourhood of Holywell, and near the road from that town to Hawarden. Copper, iron, zinc, and calamine, are also found.

Divisions, Towns, &c.—The present division is into five hundreds. Prestatyn, in the north, along the coast; Rhuddlan, in the west, toward Denbighshire; Mold, in the east and south, toward Cheshire and Denbighshire; Coleshill, in the north-east, along the æstuary of the Dee; and Maylor, comprehending the larger detached portion of the county and one or two parishes in the south-east of the main part. The smaller outlying portion is in the hundred of Mold. Flintshire contains one city and contributory borough, St. Asaph on the Elwy (population, in 1831, 3144); one principal borough and ex-county town, Flint, on the æstuary of the Dee (population 2216); six other contributory boroughs, Holywell near the æstuary of the Dee (population 8969); Mold, the present county town (population 3153); Caergwrle or Caergwyle, with Hope, on the Alen (population 2747); Overton, in the large outlying portion of the county near the Dee (population 1746); Rhyddlan or Rhuddlan on the Clwyd (population 1506); and Caerwis, or Caerwys, not far from Holywell on the road to Denbigh (population 935). Of St. Asaph and Holywell an account is given elsewhere [ASAPH, ST.; HOLYWELL]. St. Asaph, Holywell, and Mold were added as contributory boroughs to Flint by the Reform Act; Caergwyle, Overton, Rhyddlan, and Caerwis were contributory boroughs before.

Flint, from which the county derives its name, is in Coleshill hundred, on the æstuary of the Dee, 200 miles from London, through Coventry, Birmingham, Shrewsbury, Ellesmere, Wrexham, and Mold. Flint was probably a Roman station; the site occupied by the town was a rectangle surrounded with a vast ditch and two great ramparts, and having four gates, with streets regularly laid out and crossing each other at right angles: many antiquities apparently Roman have been dug up in the neighbourhood (*Pennant's Tour in Wales*, 2 vols. 4to., 1784, vol. i. pp. 69. 74, where these antiquities are figured and described); and there is a tradition that in very old times there was a large town on this spot. There are traces of Roman establishments for the smelting of the lead-ore dug in the neighbourhood. The Roman name is unknown: the present name is of Saxon origin, but it does not appear in the Domesday Survey; in which the town, if noticed at all, is possibly comprehended in the designation of Coleselt, which under its modernized form, Coleshill, is applied to a township of Holywell parish immediately adjacent to Flint. The castle was built, most probably by Edward I., a short time before the year 1280; though some writers carry back its foundation to the time of Henry II. Soon after its erection it appears to have been taken by the Welsh in their revolt, A.D. 1282. In the civil war of Charles I. this castle was garrisoned for the king by Col. Sir Roger Mostyn, but taken after a gallant defence by the parliamentarians. It shortly after fell again into the hands of the royalists; but was finally taken by the opposite party under General Mytton, and was, with the other Welsh castles, dismantled in 1647, by order of the parliament.

The remains of the castle stand a little to the north-east of the town on the summit of a rock of freestone. The castle is a square building with a round tower at three of the corners and at the fourth a round tower of much larger dimensions than the other, separated by a deep moat from the rest of the building, with which it communicated by a drawbridge. This large tower constituted the keep, or donjon, of the castle, and from its situation and the great thickness of the walls was almost impregnable. It is supposed that the low-water channel of the Dee once ran close under the castle walls, and there are still in some parts the rings to which ships were moored.

The other public buildings of the town are the parochial chapel, a county gaol, a dilapidated guild-hall, a national school-house, an almshouse for twelve poor burgesses, and a dissenting place of worship. Two dissenting congrega-

tions meet in private houses. The county gaol was built in 1785. At the time of its erection it was considered a neat and commodious building; but it does not admit of a proper classification of prisoners. The appearance of the town of Flint is very unfavourable; the streets are so broken by dilapidated walls and the gaps caused by the removal of houses as to give the place an air of desertion and irregularity.

The population of the borough and parochial chapelry by the census of 1831 was 2216, about one-eighth agricultural. The trade of the port of Flint is rapidly increasing. The æstuary of the Dee is many miles wide, but the low water channel is narrow, and it was said some years ago to be of so little depth when the tide was out that it might be crossed, by those well acquainted with it, on foot. (*A Second Walk through Wales*, by the Rev. Richard Warner, in 1798.) The obstructions caused by the shifting sands in the channel of the Dee above Flint have caused this place to become in a considerable degree the port of Chester, and the approach to the quay had been so much improved that large vessels could come up to it at any time of the tide. The neighbouring lead and coal mines, and the works for smelting the lead, give employment to a great number of persons, and furnish the principal articles for export. Of the miners, a portion drawn from the inland part of Wales speak Welsh only, but the great majority of the inhabitants speak English. The market has fallen into disuse, but there are three yearly fairs. Flint is a place of some resort as a bathing place; there are hot-baths.

The borough of Flint was established by charter of Edward I., and regulated by subsequent charters. The borough limits comprehend, beside the chapelry of Flint, the township of Coleshill Fawr, in the parish of Holywell. By the Municipal Reform Act the corporation consists of four aldermen and twelve councillors. The borough of Flint with its contributories was empowered to send one member to parliament in the reign of Henry VIII.; the right of voting was in the inhabitants paying scot and lot. The number of electors registered under the Reform Act (A.D. 1832) was 361 as scot and lot voters, and only 14 as ten-pound householders, but many who really belonged to the latter class were included in the scot and lot voters. The living of Flint is a perpetual curacy of the yearly value of 225*l.*, in the gift of the bishop of St. Asaph, who is impropriator of the great tithes. Northop is the mother church to Flint.

There were at Flint, in 1833, a national school for 140 children of both sexes, partly supported by subscription; three other day-schools with 85 children of both sexes, and three Sunday-schools with 418 children. There are few children in the borough unable to read. (*Parliamentary Returns, Reports of Corporation Commissioners, &c.*)

Mold, the present county and assize town, is in the hundred of the same name, and on the right or west bank of the river Alen; it is 194 miles from London, on the road to Flint, described above. Mold is called in Welsh, 'Yr Wyddgrug,' 'a lofty hill,' which designation it owes to 'the Bailey hill,' an eminence partly natural and partly artificial, on which formerly stood an antient castle. There is no certain mention of the place until the time of William Rufus, when the castle was in possession of the English. In A.D. 1144 this castle was stormed by the Welsh, under their Prince Owen Gwynedd, and razed. It was afterwards rebuilt, and repeatedly taken in the contests between the English and the Welsh. Of the castle itself there is no part remaining; but the ditches which defended it, or separated its parts from each other, may still be traced. 'The Bailey hill,' so called from the Ballia or courts of the castle, is even now of difficult access: its summit, which was levelled by art in order to the construction of the antient fortress, commands a view of the country round of no great extent but of considerable beauty. The site of the castle is completely covered with thriving plantations of larches and other trees. The town consists of one main street, with one or two smaller ones intersecting it at right angles; the houses are indifferent, nor are there any public buildings except the church, two or three dissenting meeting-houses, and a school-house. The church, a rich and beautiful specimen of the perpendicular English style, consists of a nave, two aisles, and chancel, and a square embattled tower enriched with sculpture and crowned with pinnacles: this tower, though of later date than the body of the church, is of similar architecture. The interior of the church is handsome: the piers and arches are very light and elegant; there are some portions of antient stained glass and several monuments The assizes are held in a private house hired for the occasion; but it is in contemplation to erect a county hall and prison.

The population of the township of Mold was, in 1831, 3153, of which about one-fourth was agricultural. The entire parish, which contains ten townships, beside that of Mold and the two chapelries of Nerquis and Treddyn, had an aggregate population of 9385 persons, of which more than a third was agricultural: the extensive coal-pits and lead and iron mines in the parish gave employment to 629 labourers. In the town of Mold 230 persons were engaged in the manufacture chiefly of cotton twist; earthenware and fire-bricks are made in the parish. There are two weekly markets (held on Wednesday and Saturday), and four annual fairs.

The living of Mold is a vicarage, in the gift of the bishop of St. Asaph, of the yearly value of 355*l.* The perpetual curacies of Nerquis, yearly value 92*l.*, and Treddyn or Tryddyn, yearly value 78*l.*, with a glebe-house, are in the gift, the first of the vicar of Mold, and the second of the bishop of St. Asaph.

By the Reform Act, Mold was made a parliamentary borough contributory to Flint: the borough comprehends the township of Mold, which contained, according to the Report of the Boundary Commissioners, about one hundred and fifty houses, worth 10*l.* a year or upwards: of these a hundred and forty were in the town.

There were in the whole parish, in 1833, two national schools, with 122 children, partly supported by an endowment; two other partially endowed schools with 122 children; thirteen unendowed day-schools with 331 children; and ten Sunday-schools with 1887 scholars, some of whom were probably adult and even aged persons.

Caergwrle, or Caergwyle, is also on the right or west bank of the Alen, below Mold, 187 miles from London, about 7 from Mold, and 13 from Flint. It is in the parish of Hope, or Queen Hope, and in the hundred of Maylor, or Maelor. The name Caergwrle is with considerable probability derived from Caer Gawr Lle, 'the camp of the giant legion,' from the 20th Roman legion, which was named 'Victrix,' and had its head-quarters at Deva (Chester). It is conjectured that this legion had an outpost here, and the conjecture is confirmed by the circumstance of a Roman sudatory, or vapour bath, hollowed out in the rock, roofed with polished tiles, on some of which was an inscription 'Legio XX.,' having been found here. Some vestiges of Roman roads and other works were formerly visible in the neighbourhood. The Roman outpost is supposed to have been on the spot now occupied by the ruins of the castle.

The oblong form of the castle, its comparative deficiency of towers, and its general agreement in structure with other castles whose origin is known, lead to the conclusion that it was of Welsh rather than Saxon origin. Previous to the final subjugation of Wales, it changed masters more than once, and appears to have been known by the English under the name of Hope Castle, and gave name to the district of Hopedale, while, with the Welsh, it bore its native designation, Caergwrle. Eleanor, queen of Edward I., lodged here on her way to Caernarvon, at which time, or soon after, the castle was burned. In Leland's time it was in a state of decay, and is now a mere ruin. The importance of this castle was derived from its strong position, and its command of the entrance into the vale of Alen: the hill on which it stood is precipitous on one side and of steep ascent on the other: on the accessible parts it was protected by deep ditches cut in the rock. This rock, which is a breccia of small pebbles lodged in grit, was formerly quarried for millstones. The neighbouring hill, called 'Caergwrle Hill,' affords limestone, of which a great quantity is burned into lime.

The parish of Hope is extensive, and had in 1831 a population of 2747, more than half agricultural: it is divided into eight townships, of which the parliamentary borough of Caergwrle, contributory to Flint, comprehends the township of Caergwrle, in which is the village of the same name, at the foot of the Castle Hill; the township of Estyn, in which is the village of Hope, with the church, a small edifice dedicated to St. Cynvarch, and containing some good monuments; and part of the township of Rhanbarfadd or Rhanbervedd. The right of voting was, before the

Reform Act, in the inhabitants paying scot and lot: the constituency was left untouched by that Act. The number of voters is about 120; the number of houses worth 10*l.* a year or upwards is about 20. The living is a vicarage, in the gift of the bishop of St. Asaph. The borough had once a charter and a municipal government; but the privileges of the burgesses had fallen into disuse and become matter of tradition even in Leland's time.

In the parish are part of the antient Wat's Dyke, and an antient British post, called Caer Estyn, a wide area enclosed by a single rampart and ditch, on a hill on the opposite side of the vale of Alen to the Castle Hill. Caergwrle and Hope are nearly a mile distant one from the other, and the river Alen flows between them.

The parish of Hope contained in 1833 two day-schools (one partly supported by donations) with 80 to 90 scholars, and ten Sunday-schools with nearly 800 scholars.

Overton is near the right bank of the Dee, in that part of the hundred of Maylor which is detached from the rest of the county; 174½ miles from London on the road to Caergwrle, Mold, and Flint.

Overton is mentioned in Domesday. There was antiently a castle here, said to have been the residence of a Welsh prince, Madoc, of Powys, lord of Overton: of this castle there are no remains. Edward I. was a great benefactor to Overton; he granted it a weekly market, and bestowed other privileges on the inhabitants. That monarch had at Overton a fishery, estimated to be worth 20*l.* a year. The market has been for some time discontinued. The village is pleasantly situated on a high bank overlooking a rich meadowy flat watered by the Dee. The church is a handsome building, and the churchyard is remarkable for some fine yew-trees. There are a Wesleyan chapel, a national school, and a house of correction for the hundred. Over the Dee, near the village, is a stone bridge of two arches.

The population of the parish in 1831 was 1746, nearly half agricultural: it does not appear that any particular branch of trade is carried on. There are four fairs in the year. The parliamentary borough, contributory to Flint, is co-extensive with the parish; and the right of suffrage, which has not been affected by the Reform Act, is in all the inhabitants rated to the relief of the poor: the number of voters is about 300: the number of houses worth 10*l.* a year and upwards is about 100. There does not appear to have been ever any municipal corporation. The parish is a chapelry, held with the rectory of Bangor Monachorum, which is in the gift of the Marquis of Westminster, and is worth 1200*l.* a year, with a glebe-house.

The parish of Overton had in 1833 six infant or dame schools, with nearly 100 children; five other day-schools (two supported by voluntary contributions), with nearly 200 scholars; and three Sunday-schools, with 150 scholars.

Rhyddlan or Rhuddlan is partly in Rhuddlan hundred, partly in that of Prestatyn, and on the right or east bank of the Clwyd, rather more than two miles above its mouth. Rhuddlan appears as a place of importance in the early part of the eleventh century when Llewelyn ap Sitsylt, prince of Wales, built a castle here in which he resided. In the time of Gryffydd ap Llewelyn, A.D. 1063, this castle or palace was surprised and burnt by the Saxons under Harold. It was soon restored, but shortly afterwards reconquered by Robert, nephew of Hugh Lupus earl of Chester. Robert fortified the castle with new works; at subsequent periods it was repeatedly attacked and taken by the Welsh and re-fortified by the English. Baldwin, archbishop of Canterbury, in his progress through Wales, was nobly entertained here. In the invasion of Wales by Edward I., that monarch made Rhuddlan his place d'armes and magazine of provisions. In 1281 it was attacked by Llewelyn, the last prince of Wales, and his brother David, but without success. David was confined here previous to his removal to Shrewsbury, where he was executed as a traitor. Edward, sensible of the importance of the place, built a new castle a little to the northward of the former one; the finishing of this work took a considerable time. He made the town a free borough and bestowed upon the inhabitants many immunities. He also assembled here, in A.D. 1283, a parliament or council, in which Wales was divided into counties, antient laws and customs which appeared detrimental were abolished, and new and more advantageous ones introduced, and many important regulations established by what was called the Statute of Rhuddlan. Here also he promised the Welsh to give them for their prince a native of the principality who never spoke a word of English and whose life and conversation no man could impugn. He fulfilled the letter of his promise by presenting to them his infant son, afterwards Edward II., then just born at Caernarvon. An old building called the Parliament House was probably the place where the king held this council. Rhuddlan Castle was in the great civil war garrisoned for the king, but was taken by General Mytton, A.D. 1646, and in the same or the following year ordered by the parliament to be dismantled.

The village of Rhuddlan consists of one principal street running down to the Clwyd and some smaller streets. There are not much more than twenty houses of the yearly value of 10*l.* or more. The principal buildings or other objects of interest are the castle, the church, the antient priory, the dissenting places of worship (one each for Wesleyan and Calvinistic Methodists, Independents, and Baptists), and a lock-up house, built at the expense of the county eleven or twelve years since. There is a bridge over the Clwyd of two arches, rebuilt or repaired about A.D. 1595. The castle of Edward I. is on the bank of the Clwyd, a little way above the bridge. It was built of red sandstone from the neighbouring rocks and formed a square externally (as we gather from Pennant's description), having at two opposite angles double round towers, and single ones at the other angles the court-yard was an irregular octagon. The ditch was large, and faced on both sides with stone. The castle on the side of the steep slope toward the river was defended by high walls and square towers. Three of the round towers at the angles and one of the square towers are tolerably entire, and there are vestiges of others. To the south of this castle, about a furlong distance, is a large artificial mound called Tut-hill or Toot-hill, on which the castle of Llewelyn ap Sitsylt and Robert of Chester seems to have stood. About half a mile south of the castle stood the priory of Black Friars, founded some time before A.D. 1268, and which continued till the dissolution. 'There is a fragment of this priory remaining which bears the marks of antiquity: the rest is disguised in the form of a farm-house and barn.' The Toot-hill and the ruins of the priory are comprehended in an extensive area surrounded by a fosse which communicates with the castle ditch. The church is of tolerable size; but the architecture is nowise remarkable. There was in very antient times an hospital at Rhuddlan.

The population of the parish in 1831 was 1506, nearly half agricultural. The river Clwyd is navigable up to the bridge at spring tides for vessels of 70 or 80 tons. From seven to nine vessels ordinarily come in at spring tides. The lead mines to the east of the town are still worked, and give employment to about 300 men. There is a large export of corn; formerly considerable trade was carried on in timber and bark, but this has recently declined. A steam-packet plies between Rhuddlan and Liverpool. Rhyl, a township in the parish, has become a place of some resort as a bathing place. There are four fairs in the year; the weekly market has been discontinued for several years.

The parliamentary borough of Rhuddlan (contributory to Flint) comprises the whole of Rhuddlan parish, a great part of St. Asaph parish, and parts of the parishes of Cwm and Diserth or Dyserth; it contains about 170 or perhaps 190 scot and lot voters. It was by charter a municipal borough, but the municipal privileges have fallen into disuse, except the annual appointment of two bailiffs, whose duties are very unimportant. The living is a vicarage of the annual value of 266*l.* with a glebe-house, in the gift of the dean and chapter of St. Asaph.

There were in Rhuddlan, in 1833, two national schools with 140 scholars, one other day-school with 64 scholars, and five Sunday-schools with 350 scholars.

Caerwys is in Rhuddlan hundred, near a small stream which runs into the Clwyd, 204 miles from London, through Overton, Wrexham, Caergwrle, and Mold. Its name is derived from 'Caer,' a fortress, and 'Gwys,' a summons: the latter part of its designation is derived from its having been a seat of judicature, first under the native princes and again after Wales had been united to England. The assizes for Flintshire were held here till the year 1672, when they were removed to Flint, and subsequently to Mold. The prefix Caer, the form of the place, consisting of two streets crossing at right angles, and numerous copper Roman coins found here, have been considered as sufficient indications that this was a Roman station. In the middle ages Caerwys was the place of holding the Eisteddfod, or general meeting of the Welsh bards.

This place, now a mere village, is seated on a wild and naked hill, surrounded by a bleak and barren district. It is very ill supplied with water, which is brought from a well a quarter of a mile distant from the village. The conveyance of water from this well forms a regular branch of traffic. Caerwys has a neat church, and meeting-houses for Wesleyan and Calvinistic Methodists, and a national school-house. The former town-hall is now used as a barn, and the former county gaol is now occupied as a dwelling-house: the judges' lodgings are now a mean hovel. The population of the parish, which is large, and comprehends four townships, was, in 1831, 985, about half agricultural. A little woollen cloth is made, and there is a small wire-mill.

The parliamentary borough, contributory to Flint, contains part of two of the four townships, Caerwys and Trefedwyn, or Trêv-Edwyn. The right of suffrage, which the Reform Act has not altered, is in the inhabitants paying church and poor-rates and not receiving parish relief. The number of voters is about 130. There are some of the forms of a municipal corporation. There are two bailiffs, a recorder, a crier, and two constables. The recorder and crier are appointed by the lord of the manor; the crier annually nominates the bailiffs, and the constables are appointed by the jury at the court-leet. The functions of these officers are but trivial.

The living is a rectory and vicarage of the yearly value of 285*l.* with a glebe-house, in the gift of the bishop of St. Asaph.

There were in the parish in 1833 one national school with 154 scholars, and four Sunday-schools with 455 scholars.

Hawarden is in the hundred of Mold, a mile and a half or two miles from the south bank of the Dee, on the road from Chester to Holywell, seven miles from Chester, and 195½ from London. The name Hawarden is Saxon, and the town was probably, at the time of the Conquest, one of the residences of Edwin, earl of Mercia. There was a castle here at a very early date: it was the residence of the barons of Mont-Alto or Mold, stewards to the powerful earls of Chester. This castle was destroyed, probably by Llewelyn, last prince of North Wales, but rebuilt before 1280. On the night of Palm Sunday, 1282, during a tempest which favoured the design, it was stormed by David, brother of Llewelyn, in their last struggle with the English. In the civil war of Charles I. it changed masters more than once, and was at the close of that contest dismantled. The remains of it are a fine circular tower or keep on the summit of a mound: this is the only part that is tolerably entire: there are no other remains except a few walls and the foundations of some rooms. The different parts of the fortress seem to have been built at different times. The town is large and well built, and consists principally of one street nearly a mile long. The church is a plain but handsome building. The population of the whole parish in 1831 was 5414, of which less than one-half was agricultural: but the population of the township of Hawarden, in which the town stands, was only 895, of which less than one-seventh was agricultural. The township of Ewloe (Eulo) and Ewloe Wood is more populous than that of Hawarden. There are several coal-pits, brick and tile works, and potteries in the parish, and there are two rail-roads for conveying the produce of these to the river. Upwards of 250 men are employed in the coal-pits. There are iron works and a laboratory for making Glauber's salts in the town. The market is on Saturday, and there are two yearly fairs.

The living is a rectory, exempt from episcopal jurisdiction, of the yearly value of 2844*l.* with a glebe-house. There are places of worship for Wesleyan and Calvinistic Methodists.

There were in the parish in 1833 an infant or dame school with 70 children; an endowed grammar-school, and five other day schools with 783 scholars; and five Sunday-schools with 158 children.

Divisions for Ecclesiastical and Legal purposes.—The county of Flint is in the diocese and archdeaconry of St. Asaph, and in the ecclesiastical province of Canterbury, with the exception of the places mentioned below. It contains, as nearly as we can gather from a comparison of our authorities, thirty-three parishes or parochial chapelries, of which six, viz., St. Asaph, Bangor, Bodfari, Erbistock, Iscoyd chapelry, and Nannerch, extend into Denbighshire. Wrexham and Gresford parishes, although extending into Flintshire, are not taken into the account, as they belong almost entirely to Denbighshire. Iscoyd (or Iscoed) chapelry is a dependency of the rectory of Malpas in Cheshire, in the diocese and archdeaconry of Chester, province of York, with which it is, as to the benefice, united. Penley chapelry is a dependency of the vicarage of Ellesmere in Shropshire, in the diocese of Litchfield and Coventry, and in the archdeaconry of Salop; and Flint chapelry is a dependency of the vicarage of Northop; but these two (Penley and Flint) form distinct benefices. The chapelry of Overton is united with the rectory of Bangor, and the chapelries of Buckley and Broughton with the rectory of Hawarden: these are all in the diocese and archdeaconry of Chester; as are Doddlestone, Hanmer, and Worthenbury.

The number of benefices, deducting from the thirty-three parishes the chapelries of Iscoyd, Overton, Buckley, and Broughton, and adding the sinecure rectories of Cwm or Combe, Cilcon or Kilken, and Whitford, is thirty-two. Of these, one, Caerwys, is a rectory and vicarage united; twelve are rectories (including the three sinecures); twelve vicarages; and seven are perpetual curacies. The richest benefice is the rectory of Hawarden, the annual value of which is 2844*l.* with a glebe-house; the next, the rectory of Bangor, the yearly value of which is 1200*l.*, also with a glebe-house; there are no other livings of so much as 1000*l.* a year; there are one between 700*l.* and 800*l.*; one between 600*l.* and 700*l.*; one between 500*l.* and 600*l.*; three between 400*l.* and 500*l.*; four between 300*l.* and 400*l.*; eleven between 200*l.* and 300*l.*; four between 100*l.* and 200*l.*; and four under 100*l.* Of one living (Hope) we have no return. The bishop of St. Asaph has twenty of the livings in his gift.

The county is included in the Chester circuit; the assizes and quarter sessions are held at Mold; but the county prison is still at Flint, the former county town.

Two members are returned from Flintshire, one for the county, and one for Flint, and the contributory boroughs. The principal place of county election is Flint; and the polling stations are Flint, Rhuddlan, and Overton. The election of the member for the boroughs is held also at Flint.

History and Antiquities.—Flintshire, with the rest of North Wales, was comprehended in the territory of the Ordovices, except those parts eastward of the Dee, which may be considered as having belonged to the Cornavii, who occupied the present county of Chester and much of the midland part of England. Pennant supposes that the part of the county west of the Dee was occupied in the summer by the Cangi, Ceangi, or herdsmen of the Cornavii, who passed the winter in the peninsula of Wiral in Cheshire, between the æstuaries of the Dee and the Mersey. From these herdsmen Pennant supposes that the district of Tegangle, which comprehended the three modern hundreds of Coleshill, Prestatyn, and Rhuddlan, took its name; being derived from *Teg*, fair, *Cang*, the name of the people, and Lle, a place. In the Roman division of Britain the Ordovices were comprehended in the district of *Britannia Secunda;* the Cornavii in that of *Flavia Cæsariensis.* Two Roman stations are by antiquaries fixed in or closely upon the borders of this county, Varæ or Varis, at or near Bodfari (in the latter part of which name the Roman designation may be traced), and Bovium, at or near Bangor on the Dee. There seems reason to suppose that the Romans had posts at or near Flint, Mold, Caergwrle and Caerwys. It is probable that they worked the lead mines of the neighbourhood, and that the posts were established with the view of protecting or carrying on that branch of industry.

In the Saxon invasion Flintshire suffered. At Banchor or Bangor (the Roman Bovium) was a vast monastery. [BANGOR.]

The great dyke which Offa, king of Mercia, carried along the frontier of his own dominion and that of the Welsh, may yet be traced to the hills which skirt the valley of the Clwyd, running across the south-western part of Flintshire. The greater part of the county was on the Mercian side of the dyke. Wat's Dyke, another antient rampart, is also to be traced running through a considerable part of the county. The territory between the two is said to have been neutral.

About a year after Offa's death (A.D. 795) a fierce battle was fought within the border of the county in the marshes between Rhuddlan and the sea, between the Britons or Welsh and the Saxons: the former were defeated with dreadful slaughter and lost their king Caradoc: a plaintive

Welsh air, Morfa Rhuddlan, preserves the memory of this disastrous day. Immediately after the capture of Chester by Egbert of Wessex, Flintshire, destitute of the mountains and fastnesses which protected the other parts of North Wales, was easily overrun by the Saxons, who gave new names to the towns, villages, and hamlets; and many Saxons settled in the county in which they held lands under the governors or earls of Mercia. It appears however to have come again under the power of the Welsh princes, and was cruelly ravaged in the reign of Edward the Confessor by the Saxons under Harold: it was reconquered from the Welsh by Robert de Rotheland, (Rhuddlan) nephew of Hugh Lupus, earl of Chester, who refortified Rhuddlan Castle. In Domesday Book a great part of the county of Flint appears as a part of that of Chester, under the name of Atis cross hundred. It had been previously called by the Saxons Englefield. In the time of the Domesday Survey there were only seven churches in the hundred, and the division into parishes had not yet been made. Atis Cross, from which the hundred took its name, was near the town of Flint. The pedestal was remaining in the earlier days of Mr. Pennant.

In the time of Henry II. the county appears to have fallen again into the hands of the Welsh, and was the scene of fierce contest when the English monarch attacked the principality of North Wales. He advanced from Cheshire into Flintshire. In the woody district of Coed Eulo, near Hawarden, a detachment of his forces fell into an ambuscade formed by the sons of Owen Gwynedd, prince of North Wales, who was encamped with his principal force near Basingwerk. The English were defeated with great slaughter, and pursued even to Henry's camp. The king himself was afterwards surprised in the defile of Coleselt (Coleshill, near Flint), and with difficulty saved himself from defeat. He succeeded however in repelling the Welsh, and afterwards obliged Owen to retreat westward over the Clwyd into Denbighshire. In subsequent periods antecedent to the final reduction of the Welsh, Flintshire continued to be debateable ground, and was the frequent scene of petty hostilities. In 1277 Edward I., who had determined on the final subjugation of Wales, built, or else rebuilt Flint Castle, and strengthened that of Rhuddlan, and prepared, by making good roads, for the advance of his troops. In 1282 the Welsh princes, Llewelyn and his brother David, rose in arms. David stormed Hawarden Castle, and in conjunction with his brother, invested Flint and Rhuddlan, the only places left to the English in the county: the former surrendered and the latter was hard pressed. The advance of the English under Edward changed the face of affairs; Caergwrle was taken by them and the siege of Rhuddlan raised, and the war carried westward into Caernarvonshire.

Flintshire appears to have been constituted a county in the time of Edward I.; it was part of the earldom of Chester, and long continued to be under the jurisdiction of the chief justice of Chester. The county and the borough of Flint, with its contributaries, received the privilege of sending representatives to parliament in the reign of Henry VIII.

In the civil war of Charles I. this county was the scene of contest. Hawarden Castle was held for the parliament, but was in 1643 taken by capitulation by the royalists. In the same year Flint Castle, which had been garrisoned for the king, was obliged to surrender to a parliamentary force under Sir William Brereton and Sir Thomas Middleton. It fell however again into the hands of the royalists. In 1645 Hawarden was retaken by the parliamentarians; and in the following year both Flint and Rhuddlan Castles fell into their hands. All these castles were ordered by the parliament to be dismantled.

Among the remains of past ages the castles are the principal: those of Flint, Mold, Caergwrle, Rhuddlan, and Hawarden have been already noticed; the others are Ewloe and Basingwerk. The ruins of Ewloe are on the edge of a wooded dingle. It consists of two parts, an oblong tower, rounded at the side and guarded on the accessible places by a strong wall at some distance from it; and an oblong yard with the remains of a circular tower at the other end of it. The towers are overgrown with ivy, and command a view of three deep and gloomy wooded glens. The only vestiges of Basingwerk castle appear to be the foundation of a wall on the verge of Offa's Dyke, in the parish of Holywell.

Of the antient religious edifices the principal are the cathedral of St. Asaph [St. Asaph]; the churches of Mold (described above), and Northop, near Flint; the abbey of Basingwerk, and the chapel over the celebrated spring at Holywell. [Holywell.] Northop church is in the perpendicular English style, and has a lofty, handsome, and well-proportioned tower. Basingwerk Abbey is of antient but uncertain foundation. Bishop Tanner ascribes it to Randal, second earl of Chester; bishop Fleetwood to Henry II.; Mr. Pennant thinks that its foundation was of yet older date, and probably due to one of the Welsh princes. The monks were of the Cistertian order, and their yearly revenues at the dissolution were 157*l.* 15*s.* 2*d.* gross, or 150*l.* 7*s.* 3*d.* clear. Henry II. established here a house of Knights Templars. The remains consist of the refectory, the chapel of the Knights Templars, and some remains of offices. The refectory is pretty entire; the Templars' chapel is spacious, with long narrow and pointed windows, and slender and elegant pilasters between them on the inside. The architecture is generally in the early English style, but some part of the remains have the short columns and round arches of the Norman style.

(Arrowsmith's *Map of England and Wales;* Walker's *Map of Wales;* Conybeare and Phillips, *Outlines of the Geol. of England and Wales;* Pennant's *Tour in Wales; Beauties of England and Wales; Parliamentary Papers.*)

Statistics.

Population.—Flintshire is, except in one or two localities, principally an agricultural county. Of 14,234 males twenty years of age and upwards, inhabitants of Flintshire in 1831, there were 6048 engaged in agricultural pursuits; 930 in manufactures, or in making manufacturing machinery; and 3597 labourers employed in labour not agricultural. Of the 930 employed in manufactures, 256 were inhabitants of the town of Holywell, and were engaged there in the manufacture of silk and cotton goods, in making paper and manufacturing iron, copper, brass, and lead; about 230 were employed principally in the cotton manufacture; and about 40 weavers were scattered throughout the county.

Hundreds, &c.	Houses.				Occupations.			Persons.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.	Males twenty years of age.
Coleshill	2,230	2,313	6	114	859	338	1,116	5,747	5,555	11,302	2,882
Maylor	2,054	2,218	3	52	1,245	593	380	5,489	5,492	10,981	2,527
Mold	2,849	2,896	22	148	980	742	1,174	7,326	7,473	14,799	3,523
Prestatyn	930	947	19	19	385	161	401	2,423	2,262	4,685	1,227
Rhuddlan	1,863	1,889	9	101	923	398	568	4,609	4,667	9,276	2,283
Holywell (town)	1,790	1,875	5	107	268	869	738	4,330	4,639	8,969	1,792
Totals	11,716	12,138	64	541	4,660	3,101	4,377	29,924	30,088	60,012	14,234

The population of Flintshire each time the census was taken in the present century was—

	Males.	Females.	Total.	Increase per cent.
1801	. .	. .	39,622	. .
1811	. .	. .	46,518	17·40
1821	26,733	27,051	53,784	15·62
1831	29,924	30,088	60,012	11·58

Showing an increase between the first and last periods of 20,390, or nearly 51½ per cent., which is 4½ per cent. below the general rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor were—

		£.		s.	d.	
1811	„	19,454,	which was	8	4	for each inhabitant.
1821	„	19,470	„	7	2	„
1831	„	20,559	„	6	10	„

The sum expended for the same purpose in the year ending March, 1836, was 16,080*l.* 3*s.*; and assuming the same rate of increase in the population since 1831 as in the ten years preceding that period, the above sum gives an average of rather more than 5*s.* for each inhabitant. All these averages are below those for the whole of England and Wales.

The sum raised in Flintshire for poor-rate, county-rate, and other local purposes, in the year ending the 25th of March, 1833, was 29,191*l.* 1*s.*, and was levied upon the various descriptions of property as follows:—

	£.	s.
On land . . .	25,250	1
Dwelling-houses . .	2,176	0
Mills, factories, &c. .	941	15
Manorial profits, navigation, &c.	823	5

The amount expended was—

	£.	s.
For the relief of the poor . .	22,357	19
In suits of law, removals of paupers, &c.	1,150	19
For other purposes . . .	4,978	15
	28,487	13

In the returns made up for subsequent years, the descriptions of property assessed for local purposes are not distinguished. The sums raised in the years 1834, 1835, and 1836 were 26,963*l.* 14*s.*, 24,215*l.* 12*s.*, and 21,935*l.* 13*s.*, respectively, and the expenditure was as follows:—

	1834.		1835.		1836.	
For the relief of the poor .	£19,565	16	£17,477	4	£16,080	3
In suits of law, removals, &c.	1,852	17	1,169	10	807	13
Payment towards the county-rate . . .	5,220	3	3,276	16	3,125	13
For all other purposes			2,441	19	2,312	15
Total money expended	£26,638	16	24,365	9	22,326	4

The whole saving effected in 1836 as compared with 1834 was therefore 4312*l.* 12*s.*, or not quite 16¼ per cent.; and the saving in the expenses for the relief of the poor was 3485*l.* 13*s.*, or rather more than 17¾ per cent.

The county expenditure in 1834, exclusive of the relief for the poor, was 3120*l.* 14*s.* 9*d.*, disbursed as follows:—

	£.	s.	d.
Bridges, building, and repairs . .	694	16	1
Gaols, houses of correction, &c., and maintaining prisoners, &c. .	751	5	4
Shire-halls and courts of justice, building, repairing, &c. . . .	509	17	2
Prosecutions . . .	525	15	11
Clerk of the peace . . .	144	3	10
Conveyance of prisoners before trial .	32	10	11
„ of transports . .	34	12	4
Vagrants—apprehending and conveying	5	19	9
Coroner . . .	130	10	9
Miscellaneous . . .	291	2	8

The number of persons charged with criminal offences, in the three septennial periods ending with 1820, 1827, and 1834, were 84, 87, and 171 respectively; making an average of 12 annually in the first period, of 12⅜ in the second period, and of 24 in the third period. The number of persons tried at quarter-sessions, in respect to which any costs were paid out of the county-rates in the years 1831, 1832, and 1833, were 14, 6, and 13 respectively.

Of this number there were committed for—

	1831.	1832.	1833.
Felonies . . .	13	6	12
Misdemeanors . .	1	—	1

The total number of committals in each of the same years were 14, 6, and 13 respectively; of whom

	1831.	1832.	1833.
The number convicted was .	14	5	12
„ acquitted .	—	1	1
Discharged by proclamation	—	—	—

At the assizes and sessions in 1836 there were 31 persons charged with crimes in this county. Of this number 10 were charged with offences against the person, 4 of which were for common assaults; 1 for an offence against property, committed with violence; 15 with offences against property committed without violence; and 5 for poaching. Of the whole number of offenders 21 were convicted and 10 acquitted, or no bill found against them. Of the number convicted 1 was transported for life and 3 for 14 years; 6 were imprisoned for one year and 10 for six months and under.

Of the total number of offenders, 28 were males and 3 females. Among the whole not one had received superior instruction; 3 could read and write well; 18 could read and write imperfectly; and 10 could neither read nor write. The proportion of the offenders to the population was, in 1836, as 1 in 2048, assuming that the population has increased since 1831 in the same proportion as it had done during the ten preceding years.

The number of persons in confinement in the county gaol at Michaelmas, 1836, exclusive of 2 debtors, was 9, viz.:—

	Males.	Females.
For Misdemeanors .	2	—
„ Felonies . . .	5	2

the whole of whom were above 17 years of age; 2 of them were awaiting their trials. The total number of persons committed to the gaol in the course of the year from Michaelmas, 1835, was 67; and the greatest number in custody at any one time was 18. Of the 9 prisoners above mentioned 2 had been committed once and 1 twice before; and 3 prisoners, probably three former offenders, were set to hard labour, 'wheeling and bruising copper dross for road materials.' The average cost per week of each prisoner for food and fuel was 2*s.* 2*d.*

The number of turnpike trusts in Flintshire, as ascertained in 1834, was 14; the number of miles of road under their charge was 85; the annual income arising from the tolls and parish composition was 13,918*l.* 13*s.* 3*d.*, and the annual expenditure 16,211*l.* 8*s.*

The number of persons qualified to vote for the county members of Flintshire was 2151, being 1 in 29 of the whole population, and 1 in 7 of the male population above twenty years of age. The expenses of the last election of county members to parliament were to the inhabitants of the county 74*l.* 9*s.* 8½*d.*, and were paid out of the general county-rate.

There are four savings' banks in this county. The number of depositors and deposits in each of the following years ending 20th of November were:—

	1833.	1834.	1835.	1836.
Number of depositors .	1941	2116	2226	2445
Amount of deposits	£60,945	£65,067	£67,701	£75,188

The various sums placed in the savings' banks in 1835 and 1836 were distributed as under:—

	1835. Depositors.	1835. Deposits.	1836. Depositors.	1836. Deposits.
Not exceeding £20	1188	£8,213	1259	£9,061
„ 50	621	18,908	745	22,777
„ 100	266	17,907	283	19,380
„ 150	92	10,895	86	9,909
„ 200	36	6,108	48	8,093
Above 200	23	5,670	24	5,968
	2226	67,701	2445	75,188

Education.—The following summary is taken from the parliamentary inquiry on education, made in 1835:—

	Schools.	Scholars.	Total.
Infant schools	8		
Number of infants at such schools; ages from 2 to 7 years:—			
Males . . .		62	
Females . . .		62	
Sex not specified .		55	
			179

	Schools.	Scholars.	Total.
Brought forward			179
Daily schools	119		
Number of children at such schools; ages from 4 to 14 years:—			
Males . . .		2,562	
Females . . .		2,102	
Sex not specified		1,257	
			5,921
Schools . .	127		
Total of children under daily instruction			6,100
Sunday schools	108		
Number of children and others at such schools; ages from 5 to 80 years:—			
Males . . .		3,851	
Females . . .		3,366	
Sex not specified		5,701	
			12,918

Assuming that the population between the ages 2 and 15 has increased in the same proportion as the whole population since 1821, we may by approximation suppose that the number of children between those ages in Flintshire, in 1834, were 21,162. A large number of scholars attend both daily and Sunday-schools, but how far duplicate entry has been thus made is uncertain. Eight schools, containing 560 children, are both daily and Sunday-schools, therefore so far duplicate entry is known to have been created. Most of the Sunday-schools consist of adult and aged persons as well as children; some are said to remain in them up to the time of their death. Making allowances therefore for these two causes of uncertainty, we may conclude that perhaps not more than three-quarters of the children between 2 and 15 years of age were receiving instruction in 1834.

Maintenance of Schools.

Description of Schools.	By endowment		By subscription.		By payments from scholars		Subscrip. and payment from scholar	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls	Scholars.
Infant Schools	..	..	..	..	8	179	..	..
Daily Schools	16	784	19	1,684	80	3,080	4	373
Sunday Schools	1	55	104	12,613	3	250	..	..
Total.	17	839	123	14,297	91	3,509	4	373

The schools established by Dissenters included in the above statement are:—

	Schools.	Scholars.
Infant schools . .	..	..
Daily schools . .	5	159
Sunday-schools . .	77	9931

The schools established since 1818 are:—

		Scholars.
Infant and other daily schools	55, containing	1,952
Sunday-schools . .	88, containing	11,691.

Two boarding-schools are included in the number of daily schools as given above. No school in the county appears to be confined to the members of the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists.

A lending library of books is attached to one school in Flintshire.

FLINTY-SLATE, or SILICIOUS SCHISTUS, is a substance which is found chiefly in beds in transition mountains, and it occurs in Saxony, the Harz, Bohemia, &c. It occurs also in Scotland, in the Pentland and Muirfoot Hills, and in the Isle of Skye, &c.

This substance is of various colours, grey, bluish-grey, and red; its structure is rather slaty; on the edges it is translucent; it is dull, or only glimmering; hard, and broken with difficulty.

It contains about 75 per cent. of silica, the remainder being lime, magnesia, and oxide of iron.

The basanite, or Lydian stone, is considered to be a variety of flinty-slate; it has not however a slaty structure, and is not so hard as flinty-slate. It occurs in Bohemia and Hungary, but was first brought from Lydia in Asia Minor, whence its name.

It is employed, when polished, for trying gold by a comparison of colours, and has thence obtained the name of touchstone.

FLODDEN FIELD. [JAMES IV.]

FLOOK. [ANCHOR.]

FLO'RA, in the Roman mythology, was the goddess of spring and of flowers, and the wife of Zephyr. Flora was also the assumed name of a Roman courtesan, who instituted certain games or festivals called Floralia, which were celebrated at the end of April, and in which women of loose character performed dances and mimic fights, throwing beans and chick-pease among the crowd. Instead of the fights of wild beasts, hares and rabbits were exhibited and chased about on those occasions. The Ædiles presided at these games. (Cicero *in Verrem*, v. 14.) The ground on which the games were performed is still called Campo di Fiora, and forms one of the squares of modern Rome, and serves as a market-place. Some pretend that the Flora who bequeathed this ground to the Roman people was a mistress of Pompey, the remains of whose theatre are close by. But the floral games were instituted long before Pompey, at the beginning of the sixth century of Rome.

Floral games, 'jeux floraux' was the name given to the poetical assemblies and competition for prizes held at Toulouse. [CLEMENCE ISAURE.]

FLORENCE, Province of (Compartimento di Firenze), one of the five provinces into which Tuscany is divided, is bounded on the north by the province of Bologna in the Papal State, on the north-east by the province of Ravenna in the same state, east by the Tuscan province of Arezzo, south by that of Siena, west by that of Pisa and by the duchy of Lucca, and north-west by the duchy of Modena. Its greatest length from east to west is about 70 miles, and its breadth about 60: its area is reckoned at 2241 Italian square miles of 60 to one degree of latitude; and its population is 681,000. (Repetti, *Dizionario geografico della Toscana*, 1837.) The surface of the country is in great measure mountainous, being intersected from north-west to south-east by the central Apennine range. That part of the province which lies on the north slope of the Apennines is called Romagna Granducale, and consists of high lands and narrow valleys, which form the beds of numerous rivers that flow towards the Adriatic. The greater and by far the finest part of the province of Florence lies south or rather south-west of the Apennine chain, and consists of the great valley of the Arno, which crosses it from east to west, and of numerous lateral valleys which follow the course of the rivers that flow into the Arno. The principal of these valleys on the left bank of the Arno are: 1, the Val di Greve, below Florence; 2, Val di Pesa; 3, Val d'Elsa; 4, Val d'Era, on the borders of the province of Pisa: on the right bank of the Arno are - 5, the Val di Sieve, called also Mugello, north of Florence; 6, Val di Bisenzio or of Prato; 7, Val d'Ombrone or of Pistoja; 8, Val di Nievole. To the north-west, near the borders of Lucca, the Florentine territory includes part of the Val di Lima, which is a tributary of the Serchio, and at its southern extremity it extends over part of the valley of the Cecina, a river that flows into the Mediterranean through the Maremma of Pisa. The valleys produce corn, wine, oil, silk, and abundance of fruit. The mountains are planted with chestnut and timber trees, and afford abundant pasture. The farms are generally very small, and are mostly let to tenants-at-will on the metayer system. A great resource of the country people is the manufacture of straw hats, the straw for which is that of a peculiar description of wheat cultivated for the purpose, and very thickly sown and cut down before it is ripe. The country girls and men employ themselves in platting this straw, and the profit they derive from it forms a considerable addition to their means of support. The appearance of the peasantry, especially in the Val d'Arno, is pleasing; there is an air of health, comfort, and cheerfulness, a smartness of dress and a cleanliness of the person, superior to what is seen in most other parts of Italy. Many of the women wear round beaver hats like the men. The other manufactures in the country are pottery and china ware, cloth, paper, leather, &c., mostly for internal consumption. The silk manufacture, once very flourishing at Florence, has greatly declined during the present century. The manners of the country people are simple, sober, and decent. The church festivals, which recur at various epochs of the year, are days of mixed devotion and rejoicing, to which the people are much attached. Heinous crimes, such as murders or robberies, are of very rare occurrence. There are elementary schools in every commune, but without any obligatory law to enforce the attendance of children, as in Austrian Lombardy. There are besides grammar schools in the

towns, kept by the Scolopj, the Brothers of S. Filippo Neri, and other religious congregations. Lancasterian schools, holiday schools, and infant schools have been established of late years, through the exertions of benevolent individuals, among whom the Abate Lambruschini stands foremost. Upon the whole, although there are still many illiterate persons in the country, a general refinement of manners and address, and a quickness of perception and justness of reasoning, are prevalent, to which the kind and friendly intercourse which exists between landlords and tenants greatly contributes, as well as the universally established use of the same oral and written language which is spoken with nearly equal purity by all classes of persons.

For administrative purposes the province of Florence is divided into 28 districts called cancellerie, which contain altogether 90 communes, having each a gonfaloniere and a communal council. The districts have each a political governor, called cancelliere, and they are named from their chief towns as follows:—1. Bagno in the valley of the Savio, near the borders of Papal Romagna, contains two communes and 7515 inhabitants; 2. Galeata in the valley of the Bidente or Ronco, two communes and 4533 inhabitants; 3. Rocca S. Casciano in the valley of the Rabbi and Montone, five communes and 11,528 inhabitants; 4. Terra del Sole in the valley of the Montone, one commune and 3309 inhabitants; 5. Modigliana in the valley of the Marzena near the borders of Faenza, one commune and 4810 inhabitants; 6 Marradi in the valley of the Lamone, two communes and 1050 inhabitants; 7. Firenzuola in the valley of the Santerno, one commune and 8316 inhabitants; the old road from Florence to Bologna passed through it. All the above districts are north of the Apennine chain. On the south side of the mountains are: 8. Scarperia in the valley of the Upper Sieve or Mugello, containing five communes and 22,870 inhabitants; 9. Borgo San Lorenzo in the Middle Sieve, with four communes and 26,344 inhabitants; 10. Pontassieve at the confluence of the Sieve with the Arno, three communes and 18,575 inhabitants; 11. Figline in the Valdarno above Florence, three communes and 33,239 inhabitants; 12. FLORENCE one commune with 95,927 inhabitants; 13. Fiesole eight communes and 52,282 inhabitants. The town of Fiesole is much decayed, and hardly contains 3000 inhabitants. It is a bishop's see, and has a remarkable cathedral and several other churches. 14. Galluzzo in the valley of the Arno south of Florence contains six communes and 52,177 inhabitants; 15. San Casciano in the Val di Greve, three communes and 25,900 inhabitants: 16. Castel Fiorentino in the Val d'Elsa, three communes and 20,114 inhabitants; 17. Empoli in the valley of the Lower Arno, five communes and 29,664 inhabitants. Empoli is a thriving well-built town on the left bank of the Arno, in a very fertile country; it has several manufactories of cotton, leather, glass, and 5500 inhabitants. 18. San Miniato, below Empoli, one commune and 13,960 inhabitants; 19. Castel Franco di Sotto, four communes and 11,235 inhabitants; 20. Volterra, between the Era and the Cecina, two communes and 43,009 inhabitants [VOLTERRA]; 21. Fucecchio on the north bank of the Lower Arno, with two communes and 16,390 inhabitants; 22. Pescia in the Val di Nievole, four communes and 18,173 inhabitants; 23. Monte Catini in the same valley, two communes and 10,549 inhabitants; 24. Buggiano also in the Val di Nievole, two communes and 11,904 inhabitants; 25. San Marcello in the valley of the Lima, among the Apennines of Modena and Lucca, contains three communes and 10,140 inhabitants; 26. Pistoja has five communes and 43,433 inhabitants; 27. Potesterie di Pistoja, which include seven communes formerly subject to that town, and 36,326 inhabitants [PISTOJA]; 28. Prato in the valley of the Bisenzio, has two communes and 38,885 inhabitants. The town of Prato, 12 miles north-west of Florence, at the foot of the Apennines, is a bishop's see, has a handsome cathedral, a college, besides a seminary for ecclesiastical students, a public library, a printing-press, an hospital, a monte di pieta, several manufactories of coarse woollens, and about 10,000 inhabitants. The road from Florence to Prato crosses a fine level country, highly cultivated, and thick-set with gardens and villas.

Further particulars concerning the government, industry, commerce, and other statistics of this country are given under the head TUSCANY. The climate of the province of Florence is generally healthy, and the winters are much colder than in the plains of Pisa near the sea: the highlands of the Apennines are bleak and barren; the lowlands are pleasant and fertile, but in many parts are subje t to inundations of the Arno and its affluents.

FLORENCE, FIRE'NZE, or FIORE'NZA, the capital of the Grand Duchy of Tuscany, and an archbishop's see, is situated in the valley of the Arno, which river divides it into two unequal parts, the larger or original city being on the right or northern bank. Its shape is a pentagon about six miles in circuit; it is enclosed by walls and has eight gates, six of which open to high roads leading to Arezzo, Siena, Pisa, Pistoja, Bologna, and to the Vallombrosa and the Casentino. On the north and north-west a fine plain a few miles in breadth is interposed between the town and the Apennines, which rise to the height of more than 3000 feet above the plain, and the upper ridge of which has a naked and barren appearance. To the north-east the hill of Fiesole, covered with gardens and country-houses, almost touches the city walls. That part of the town which is south of the Arno runs up the declivity of a rather steep hill, which is partly enclosed within the walls; the gardens of Boboli and the fort of Belvedere crown the higher grounds within the enclosure. Four bridges over the Arno connect the two parts of the city; the handsomest of the four is the Ponte Santa Trinita which is adorned with marble statues, and the middle arch of which is 90 feet in span. In the central or most antient part of Florence (for the town has been repeatedly enlarged, the actual line of walls dating from the 14th century,) which lies chiefly between the cathedral, the old market, the town palace, and the river, the streets are mostly narrow and irregular, and many of the houses have a mean or dilapidated appearance, though here and there are fine churches and massive square stone palaces which look like fortresses, and were partly intended as such during the civil contentions of the commonwealth. But the streets which lead from this central part to the present gates and which from their more recent date are still called Borghi, or suburbs, are laid out on a regular plan: the outer part of the town also is handsomely built, the houses being interspersed with gardens, especially in the neighbourhood of the city walls. The most remarkable structures in Florence are,—1. The Duomo or Cathedral, which was begun at the end of the 13th century by Arnolfo di Lapo, was continued by Giotto and other successive architects, until Brunelleschi completed it in the 15th century by raising the noble cupola which excited the admiration of Michel Angelo. This magnificent building is surrounded by an open place; on one side of it rises a detached square tower or belfry 250 feet high, and before it the baptistery of St. John, an octagon chapel rich with sculptures and mosaics. The whole group of buildings is cased in marble party-coloured black and white. A full account of the cathedral and baptistery is given by Sgrilli, *Descrizione dell' insigne Fabbrica di S. Maria del Fiore, Metropolitana Fiorentina*, 2nd edition, 1756; and there are splendid engravings of it in the work recently published in parts at Milan, entitled *Chiese principali d'Europa*. 2. Il Palazzo Vecchio, or town-house, which was the seat of the government of the Florentine republic, a square massive-looking structure surmounted by a tower 260 feet high, from which the great bell used to toll to assemble the citizens or call them to arms. The square in front is adorned with a noble fountain and with marble and bronze statues. A description of this palace is given by Rastrelli, *Illustrazione Storica del Palazzo della Signoria detto Palazzo Vecchio*, Florence, 1792. 3. Between the Palazzo Vecchio and the Arno is the handsome building, called Gli Ufficii, with arcades forming three sides of an oblong court 400 feet in length, raised by the Grand Duke Cosmo I.: the first story is occupied by the archives, the treasury, other public offices, and the Magliabecchi library, which contains 150,000 printed volumes and 12,000 MSS. The second story contains the celebrated galleria, or museum, formed by the Medici, which is one of the richest existing collections in sculptures, medals, cameos, bronzes, paintings, and other works of art. Full descriptions of it with plates have been repeatedly published. 4. The Church of San Lorenzo, built by Brunelleschi, the numerous altars of which are adorned with the paintings of Florentine masters. In the body of the church is the modest tomb of the elder Cosmo, called Pater Patriæ; in the old sacristy is that of his father, Giovanni, the princely merchant, the head of his family and the founder of this church; and in the new sacristy are the celebrated monuments of Giuliano de' Medici and of Lorenzo Duke of Urbino, by Michel Angelo Behind the choir of the church is the sepulchral chapel of

the grand dukes of the house of Medici, rich in marble, jasper, agates, lapis lazuli, and other valuable stones, on which account it has received the name of 'Cappella delle Pietre dure;' but it is much inferior in the taste and workmanship of its mausolea to the plain marble monuments of Michel Angelo in the neighbouring sacristy. Annexed to the church is the building begun by Michel Angelo and finished by Vasari, containing the valuable library of MSS. called Laurentiana, collected in great part by Cosmo, Lorenzo, and the other members of the first house of Medici, but considerably increased since. Bandini has published the catalogue of the Greek, Latin, and Italian MSS.; and Biscioni and Assemani those of the Hebrew and Oriental ones. 5. The Church of Santa Croce is remarkable chiefly for the sepulchral monuments of Machiavelli, Michel Angelo, Galileo, and Alfieri. 6. The palace Pitti, the residence of the grand duke, begun by Brunelleschi and finished by the Grand Duke Cosmo I., has a splendid gallery of paintings and a library of 70,000 printed volumes and 1500 MSS. chiefly Italian, among others the correspondence of Machiavelli and that of Galileo. The adjoining gardens of Boboli are extensive, and afford a pleasant promenade to the public, but they are laid out and the trees are cut in the old formal style; the fountains are remarkably fine.

Besides the above, which are the most remarkable edifices in Florence, there are numerous other structures which would be considered as an ornament to any city; such as the palace Riccardi, with its valuable library, now the property of the community; the palace Strozzi, one of the most remarkable specimens of the old massive and stern Florentine architecture; the modern palaces Corsini, Borghese, and many others; the churches of San Marco, Santa Maria Novella, l'Annunziata, Ognissanti, &c.; the two principal theatres; the Academy of the Fine Arts; the hospitals; and the public walks outside the gates, all of which have been described in separate publications. For a general description of the remarkable objects in Florence, see *Guida della Città di Firenze*, 1822; and *Scelta di 24 Vedute delle principali Contrade, Piazze, Chiese e Palazzi di Firenze, disegnate da* Zocchi, in fol.

Florence contains many charitable and other useful institutions. There are nine elementary schools for boys, besides the schools kept by several religious congregations; four schools for girls; the Instituto della SS. Annunziata, which 800 girls are boarded and instructed, and provided for when they leave the house; besides asylums for the orphan, the blind, the deaf and dumb, and other unfortunate persons; and 'confraternite,' or associations of charitable persons, for attending the infirm and burying the poor dead. The medical and surgical college attached to the hospital of Santa Maria Nuova is one of the best medical schools in Italy. The principal academies are that of La Crusca; that of the fine arts, which reckons several distinguished contemporary artists, such as the painter Benvenuti, and the engraver Morghen; and the Academy dei Georgofili, which encourages agriculture, and publishes a quarterly journal, called 'Giornale Agrario Toscano.'

The state of education among the Florentines is noticed under the head of FLORENCE, PROVINCE OF; the reader may also consult on this subject a very full article, *State of Education in Tuscany in the year* 1830, in No. III. of the *Journal of Education*. The people of Florence are civil, industrious, sober, steady, economical even to parsimony, loquacious and satirical, but docile and quietly disposed. Among the wealthy and fashionable class morals are pretty much on the same standard as in most other Italian cities, only there is perhaps greater outward decorum maintained. Fortunes are moderate, and mostly derived from landed property. Among the Tuscan nobility are many individuals distinguished for their learning, and for the liberality with which they exert themselves in promoting useful and charitable institutions, such as schools, savings' banks, and works of public utility.

Florence is upon the whole the most pleasant place of residence in all Italy. Strangers have also the advantage of the best reading-rooms in the whole peninsula, which are supplied with foreign journals and literary novelties.

The price of provisions is moderate, the country very fine, and the climate generally healthy, though at times foggy in the autumn and cold in the winter. The whole neighbourhood of Florence is studded with villas, country-houses, and gardens, which made Ariosto say, that if they could be all collected within the enclosure of a wall and joined to the actual city, Florence would be more than equal to two Romes. Florence is 43 miles east of Pisa, 51 south by west of Bologna, and 145 north-north-west of Rome.

History of Florence.—This town owes its origin to a colony of Roman soldiers, sent by Octavianus after the victory of Perusia, to whom he allotted part of the territory of the colony of Fæsulæ, established about forty years before by Sulla. In the reign of Tiberius we find the Florentines mentioned by Tacitus (*Annal.* i. 79) as having sent a deputation to Rome to deprecate the intended diversion of the course of the Clanis into the Arno, by which their fields would have been exposed to inundation. About A.D. 119 Hadrian, who had been prætor of Etruria under Trajan, restored, in the second year of his reign, the Via Cassia from Clusium to Florentia. Little else is known of Florence under the empire, and hardly any remains exist of that period, except some relics of an amphitheatre, and a few inscriptions. Christianity seems to have been established at Florence in the third century, and several martyrs are recorded there under Decius. In the year 313 Felix bishop of Florence attended a council at Rome. About 405 the town was threatened by the Goths under Radagaisus, but was saved by Stilichon, who defeated the barbarians in its neighbourhood. In 542, being again attacked by the Goths under Totila, it was successfully defended by the garrison which Belisarius had left in it. In 553 the Florentines sent a deputation to Narses to propitiate that commander in their favour. The Longobards afterwards occupied Florence, apparently without violence, and Tuscany became one of the duchies of their kingdom. Upon the whole, Florence seems to have escaped comparatively unhurt the ravages of the northern invaders, owing probably to its situation. Charlemagne having conquered the Longobards, organized the various provinces of their kingdom: he appointed at Florence a political chief called duke, and afterwards count, under whom were various officers called scabini, vicarii, vicedomini, advocati, and centenarii, who by the Capitularies of the year 809, ch. xxi., were to be chosen by the count and the people together. Thus a municipal government was early given to Florence. In the eleventh century, when Italy began to be involved in the long quarrel between the church and the empire, Florence with the greater part of Tuscany was under the jurisdiction of the Countess Matilda, who dying about 1115 left her inheritance to the Roman see. From that time the towns of Tuscany began to govern themselves as independent commonwealths, and the popes favoured this state of things. Florence had then a very limited contado, or territory, extending only a few miles round its walls; but the industry and speculative spirit of its citizens wonderfully enriched them. They had commercial establishments in the Levant, in France, and in other parts; they were money-changers, money-lenders, jewellers, and goldsmiths. In 1078 they first enlarged the circuit of their town. In 1113, while the Countess Matilda was still living, the citizens of Florence took up arms to repel a new delegate or vicar sent by the emperor and accompanied by a troop of armed men furnished by the neighbouring feudatories. They met him at Monte Cascioli, then an estate of the counts Cadolingi, about six miles west of Florence: Robert the imperial vicar was killed in the conflict, and his men were routed. This was the first military exploit of the Florentine community, and from that time Florence was numbered among the towns attached to the popes and opposed to the emperors, or as they were afterwards called in the following century, the Guelph party, although many of the neighbouring feudatories were of the opposite or imperial party; and as several of them at various epochs became citizens of Florence, or became connected by marriage or otherwise with Florentine families, the seeds of internal discord were thus sown within its walls.

In 1177 the first internal disturbance is recorded as raised by the Uberti, a powerful family, supported by their dependants and friends, against the consuls, or municipal magistrates, who were elected by the various trades. The town became divided into factions, each headed by some turbulent family: they fought in the streets, from palace to palace, and tower against tower: of these towers there were many within the town more than 100 braccia high (about 150 feet). (Malispini, *Cronica Fiorentina*, cap. 80.)

In 1215 the whole town was divided into two factions, in consequence of a young man of the family of Buondelmonti, who was betrothed to a young lady, a relative of the Uberti,

having broken his faith to her and married another of the family of Donati. The Uberti and their relatives stabbed the promise-breaker in the street. The citizens took part, some with the Uberti, and others with the Buondelmonti and Donati. As the Uberti were partisans of the emperor Frederic II., the two parties assumed the respective names of Guelphs and Guibelines, and the private feud was mixed up with the great quarrel which then divided all Italy. In the course of this struggle, sometimes one, sometimes the other of the two parties prevailed, when the leaders of the losing faction generally left the town to return at the first opportunity. The majority of the citizens however were Guelphs, and their party predominated in the town when the emperor Frederic II. died in 1250. Emboldened by this event, the Guelphs of Florence, not content with ruling over their community, sent forces against Pistoja, Pisa, and Siena, which belonged to the Guibeline party, defeated the Pisans, made an incursion into the valley of Mugello against the Ubaldini, who, as well as the Guidi, were great Guibeline feudatories in the Apennines, and sent another force into the Valdarno against the Florentine emigrants who had gathered there. All this occurred in 1252, which was thenceforth remembered by the Florentines as 'the year of victories.' In 1254 they took Volterra. This was to Florence a period of great success, and it was then that they first coined their golden florins, of twenty-four carats, and of the weight of a drachm, bearing the impression of John the Baptist, the patron of Florence, and a lily, the device of the city. This was considered the finest coin in all Europe. It was also about this time that the government was reformed. Instead of the consuls of the trades, a council of twelve anziani, or elders, was appointed, two for each district of the town, who were civil magistrates, and a podesta was chosen from some other town to administer justice, whose decisions were without appeal. Another stranger was chosen as captain of the people, or commander of the militia, composed of the citizens formed into companies under their respective gonfalonieri, or standard-bearers. These two last officers were renewed every two years, and sometimes yearly. It was at that time a prevailing custom of the Italian cities to choose their podesta from among strangers, to avoid the risk of partiality arising from connexion and friendship; but the temptation of bribery or seduction still remained.

Meantime the Guibeline emigrants had gathered at Siena, and being supported by Manfred, king of Naples, they took the field under Farinata degli Uberti, an able leader, who surprised the Florentines and other Guelphs of Tuscany at Monteaparto, on the banks of the Arbia, a few miles from Siena, on the 4th September, 1260, and completely defeated them, with the loss of 10,000 killed and a number of prisoners. The Guibelines entered Florence in triumph, the principal Guelphs who survived fled to Lucca, their property was confiscated, their houses were razed, and a new magistracy was formed from among the Guibeline party, who took the oath of allegiance to Manfred. At a general diet of the Guibeline cities, held soon after at Empoli, it was proposed to raze Florence to the ground, and distribute the inhabitants among other towns, as the bulk of the population was too much Guelph to be trusted; but Farinata indignantly resisted the proposal, saying he would sooner join the Guelphs than see his native town destroyed: this threat had its effect, and Florence was saved. Dante has justly praised Farinata for this patriotic act, in which the feelings of the citizen rose above the passions of the partisan.

In 1265 the defeat and death of Manfred, at Benevento, turned the scale against the Guibelines. The Florentines in the following year drove away the garrison left by Manfred, and offered their allegiance for ten years to Charles of Anjou, king of Naples, who sent them 800 French horsemen under Gui de Montfort as his vicar. A new organization of the government took place, which was divided among several councils. There was a council of twelve Buonomini, who were to give their opinion first on every new measure, law, or tax proposed, after which the measure, if approved by them, was laid before the council of credenza, or 'trust,' a sort of senate composed of the gonfalonieri of the higher trades and other notables, who deliberated in secret, and from them the motion came before the council of 300, consisting of deputies from all classes of citizens, presided over by the podesta, which gave its final sanction. The mode of electing these various councillors is not very clearly ascertained. There was also much confusion between the legislative and judicial powers in all the Italian cities, and the laws and customs were generally so barbarous and absurd, that there was no security for person or property. (Sismondi's *Italian Republics;* Hallam's *Middle Ages;* also an article in the *Foreign Quarterly Review,* xxiv., October, 1833, on the *History of Modern Italian Freedom.*)

In 1268 the expedition of Conradin gave a momentary preponderance to the Guibelines, but they were soon expelled again from Florence. In 1273, by the mediation of the pope, peace was made between the two parties, and the Guibelines were recalled, but this harmony did not last long. In 1280 Cardinal Latino Orsini, legate of Pope Nicholas III., made a new peace: the more violent Guibelines were banished for a time, but their property was restored to them, and the rest of their party were allowed to return, and to participate in the offices of the state. But the Guelphs being stronger, did not keep their promises towards them. From this epoch and for the next thirty years we have a faithful guide among the intricacy of the internal feuds of Florence in the chronicler Dino Compagni, from whom a brief account of those transactions in which both he himself and the poet Dante acted a part, is given under the head DANTE. The institution of the Priori, or supreme executive magistrates, who were chosen from among the higher trades, one for each district or ward of the city, and renewed every two months, dates from this epoch, and lasted till the end of the republic. All those families who had titles of nobility conferred upon them, whether Guelphs or Guibelines, were declared to be excluded for ever from the higher offices of state. They formed the class called Dei Grandi, and were 33 families, mostly Guelph, as the Guibelines had been previously exiled. Machiavelli remarks on this occasion that 'the plebeians of Rome aimed at sharing in the offices and honours of the state in common with the patricians, an aim just and reasonable, and in which they succeeded, while those of Florence fought in order to monopolize the government, to the exclusion of the nobles, which made the latter more desperate, and led to a perpetual recurrence of slaughter, banishment, and confiscation.' (*Istorie Fiorentine, proemio,* lib. iii.) But Machiavelli seems to have overlooked the difference in the constitution of society in the two cities: at Rome the patricians were the original inhabitants, while at Florence the nobles were most of them originally strangers who had asked for and obtained the freedom of the city, or citizen families who had obtained titles of nobility from the emperors or other foreign rulers.

After the feuds of the Bianchi and the Neri, and the banishment of the former, the Florentines besieged and took Pistoja by famine in the year 1306. The siege was attended with circumstances of the greatest atrocity, like most of the wars of the Italian cities in the middle ages, and which are indignantly related by honest Dino. In August, 1315, Uguccione della Faggiuola, at the head of the Guibelines of Pisa, completely defeated the Florentines, joined by the other Guelphs of Tuscany, at Monte Catini, in the Val di Nievole. But Uguccione himself being driven away from Pisa for his tyranny towards the citizens, Florence had time to recover from its loss. Uguccione was succeeded in the command of the Guibelines of Tuscany by Castruccio Castracani, lord of Lucca, who took Pistoja, and defeated the Florentines in a pitched battle at Altopascio, near the marshes of Bientina, in September, 1325. Castruccio advanced to within a mile of Florence, and had the bishop of Arezzo joined him with his forces, he would have taken the town. But the Florentines received timely assistance from the Anjou king of Naples, while the Emperor Ludovic V. came into Italy to support Castruccio and the Guibelines, whose cause however met soon after with an irreparable loss by the death of Castruccio in September, 1328. [CASTRUCCIO CASTRACANI.] Charles duke of Calabria, on whom the Florentines in their distress had conferred the signoria, or lordship, of their city, and who had already given proofs of a tyrannical disposition, died about the same time. Death, Machiavelli observes, was the best ally of the Florentines in their most urgent distresses. While they were threatened by Castruccio, one of their principal merchant houses failed for the sum of 400,000 golden florins, which added greatly to their distress. In 1333 a great flood of the Arno carried away three bridges, part of the walls, laid most of the streets of Florence under water, and caused heavy damage. Some years afterwards two more commercial

companies, Peruzzi and Bardi, failed in consequence of the loss of 1,365,000 golden florins, being capital and interest of sums which they had advanced to Edward III. of England, and which he was unable to repay.

These facts give an insight into the sources of the extraordinary wealth and resources of the Florentines. These sources were twofold, the numerous manufactures at home and the trade and banking speculations carried on by Florentine merchants abroad. Among the manufactures the most important were those of woollens, silks, and jewellery. The citizens of Florence were classed from 1266 into 12 arti, or companies of trades or professions, seven of which were called arti maggiori, namely—1, lawyers and attorneys; 2, dealers in foreign stuffs; 3, bankers and money-changers; 4, woollen manufacturers and drapers; 5, physicians and apothecaries; 6, silk manufacturers and mercers; 7, furriers. The arti minori, or lower trades, were originally five—retailers of cloth, smiths, shoemakers, butchers, carpenters, and masons; but they were afterwards increased to 14. Every citizen who wished to be eligible to office was required to inscribe his name on the rolls of one of the trades. Dante had his inscribed on the roll of the apothecaries, although he never exercised that profession. Of the importance of their foreign trade, and the influence which the Florentine merchants or bankers had attained in foreign countries, we have a proof in the fact, that when Pope Boniface VIII. after his election, received the congratulatory addresses of foreign states, it was observed that no less than 12 envoys accredited to him on the occasion were citizens of Florence, on which Boniface exclaimed, that 'the Florentines constituted the fifth element of the creation.'

Their armies, especially when upon a long expedition, were chiefly composed of mercenaries and auxiliaries, and mostly commanded by a foreign captain, or condottiere, by whom they were often badly served or betrayed. The towns and districts subject to Florence retained their local statutes, and elected their own magistrates, like the municipia subject to antient Rome, but they had no share in the central government of the republic.

Fresh dissensions among themselves and an unfortunate campaign against Pisa made the Florentines look out again for a foreign protector. King Robert of Naples sent them one of his officers, Gaultier de Brienne, of French extraction, but born in Greece, who bore the title of Duke of Athens, and who had already some years before come to the assistance of Florence against Castruccio. Many of the citizens, weary of civil feuds, contrived to have him elected by acclamation lord of Florence for life, in 1342, thus superseding the ordinary government of the Priori and Gonfaloniere. He began by putting to death or sending into exile a number of citizens of the wealthier popular families who had till now kept the government in their own hands, and who were obnoxious both to the nobles who were excluded from office and to the inferior orders who attributed to them all their troubles. Having a foreign force of Frenchmen and Neapolitans at his disposal, his sentences were summarily executed. In the course of ten months he contrived to draw 400,000 golden florins, which he transmitted to Naples. He soon incurred the hatred of all parties, and having convoked for the 26th July, 1343, a number of distinguished citizens to consult with them on the affairs of state, but really for the purpose of putting them to death the people, who were already prepared, rushed to the palace at the cry of 'popolo, popolo,' dispersed the duke's cavalry, and obliged him to capitulate on the 3rd of August, when the bishop of Florence had him conveyed safely with his men outside of the territory of the republic. Thus Florence recovered its independence, and the memory of that deliverance, called 'la Cacciata del Duca d'Ateno,' is still solemnized at Florence by the display of the flags of the various trades on the 26th of July.

It was now agreed that the grandi, or antient nobles, should have a share of the offices of the state, but as they soon assumed too much, they were driven away again from the town-hall. Upon this they took up arms, and a battle ensued in the streets of Florence, in which the grandi were defeated and their houses plundered and burnt. This was the last struggle of the nobles at Florence. (Machiavelli, lib. 11.) But a few years after a new quarrel broke out between two wealthy citizen families, the Albizzi and the Ricci, which divided the city into two parties again. The Albizzi at length preponderated, and after exiling a number of citizens of the opposite party, they formed a government composed entirely of popolani grassi, or wealthy citizens. The way in which the Albizzi, and the Medici after them, contrived to monopolize the power of the state, was by calling together the general assembly of the people in the great square, which, not being able to deliberate, voted by acclamation a Balìa, or dictatorial commission. This commission appointed a permanent council, a sort of senate which chose the citizens whom it thought qualified to fill the principal offices of state. These general assemblies, called 'parlamenti,' were resorted to in factious times, and were swayed by the strongest or boldest faction. (Machiavelli, *Istorie Fiorentine.*) The lower trades, instigated by the Ricci and the Medici, who began at that time to court notice and popularity, broke out into insurrection in 1378, forced the town-hall, burnt the archives, and after three days of anarchy, elected a woolcomber, Michele Lando, as chief magistrate. Lando, who was a man of natural good sense, succeeded in re-establishing order and checking the rioters. After several years of troubles, the popolani grassi, with the Albizzi at their head resumed the power in 1382, and formed a new aristocracy, which succeeded in retaining the reins of the government for 52 years, not however without occasional tumults, conspiracies, and insurrections, until the year 1400. From that year, Machiavelli says, the city remained internally quiet till 1433, the longest period of tranquillity which Florence had ever known. The state was fortunate in its external politics; its two most formidable enemies Gian Galeazzo Visconti, duke of Milan and Ladislaus, king of Naples, being carried off, the former by the plague and the other by another contagion, just as they were threatening Florence with destruction. The Florentines acquired possession, partly by force and partly by purchase, of Cortona, Arezzo, Livorno (Leghorn), part of the Romagna, and lastly of Pisa, which they took through famine and treachery in September, 1406. The Florentines behaved with great humanity and even generosity in order to reconcile the Pisans to their yoke; but all the antient and most opulent families of that city emigrated to Lucca, Sardinia, and Sicily, the young men engaged in the free companies of the various Condottieri; and Pisa, in losing its independence, lost its commerce, its population, and its prosperity.

The administration of the Albizzi was overthrown by Cosmo de' Medici, a popular citizen and a princely merchant, in 1434. From that moment the history of Florence became closely connected with that of his house, and the sequel is given under the head MEDICI.

The first house of Medici respected the republican forms, and were contented with exercising the chief influence in the state without emerging from the class of citizens. But the foreign wars which desolated Italy in the 16th century effected the fall of that republic, when a member of a lateral branch of the Medici, the line of Cosmo having become extinct, was placed by Charles V. as duke of Florence. [COSMO I.] The ducal dynasty of Medici continued to rule till the year 1737, when, becoming extinct, they were succeeded by Francis of Lorraine, afterwards emperor of Germany, and husband of Maria Theresa of Austria. [TUSCANY.]

FLORES, an island 30 miles long, with a mean breadth of 9 miles, is one of the Azores, and situated in 39° 34′ N. lat., and 31° W. long. It derived its name from the multitude of flowers with which it abounds. There are two small towns on the east coast, called Santa Cruz and Lagena. There is little trade, but the island produces abundance of wheat and pulse; and a great number of horned cattle of small size are bred. The number of inhabitants is said to be about 1400.

FLORES, sometimes called Endé, an island in the Indian archipelago lying between 8° and 9° S. lat., and between 120° and 123° E. long. Its length is about 200 miles from east to west, and its average breadth about 35 miles. The surface of the island is hilly, particularly on the south side, where there are several high volcanic mountains, from one of which there was an eruption in 1810. The principal port, Endé, is on the south side of the island; it has an excellent harbour. Larantuka, a town on the east side, on the straits of Larantuka, in 8° 45′ S. lat. and 123° E. long., is in the possession of the Portuguese, who have succeeded in bringing many of the natives to the profession of the Catholic faith. This is the only part of the island in possession of Europeans. Endé was formerly subordinate to the Dutch residency at Coopang in the island of Timor;

but in 1812 the Bugis inhabitants succeeded in expelling all Europeans, and have since refused to hold any intercourse with them. The coast is mostly colonized by Bugis and Malays, but the interior is inhabited by aborigines, about whom and about their customs and institutions little or nothing is known. They more resemble in their persons the Papuas of New Guinea than any other inhabitants of the Eastern Archipelago.

FLORIAN, JEAN PIERRE CLARIS DE, was born of a noble family in the Château-Florian, in the Cevennes, in 1755. His education was superintended by his grandfather; but, on his dying deeply in debt, Florian was obliged to look around him for some means of support. The Marquis de Florian, his uncle, who had married a niece of Voltaire's, took young Florian to Ferney, where the philosopher spoke encouragingly of his talents. He became in 1768 page of the Duc de Penthièvre, and finding that he had a passion for the army, that nobleman gave him a company of the dragoons de Penthièvre. He shortly afterwards retired from active service, and accepted the place of gentleman in ordinary to the duke, who treated him as a friend. Having now an opportunity to devote himself to literature, he produced in 1783 the romance of 'Galatea,' in imitation of the novels of Cervantes. His mother being a Castilian, he was perfectly familiar with the Spanish language. 'Galatée' was followed by the well-known 'Numa Pompilius,' published in 1786. The pastoral romance of 'Estelle,' which was produced two years afterwards, and was reckoned by critics his best production, caused but small sensation at the time. He also brought out a collection of fables and a number of little comedies, in the Italian style, with Arlechino for their hero, which were very successful. In 1791 he published his romance 'Gonzalve de Cordoue,' which was preceded by an historical notice of the Moors, which has been greatly esteemed. In 1793 he was banished from Paris by the decree published against the nobility, and retired to Sceaux, the inhabitants of which received him with cordiality, as he had always been, in conjunction with the Duc de Penthièvre, their benefactor. He was afterwards arrested, and confined in the prison called Port Libre, but he was soon liberated. His health was so affected by anxiety, that he died in 1794, having, during his incarceration, written the romance of 'Guillaume Tell.'

Florian seems to have been a writer who did little else than imitate, in an inferior manner, the authors who had preceded him. 'Galatée' is an imitation of Cervantes; 'Numa' of Fenelon's 'Telemaque;' and the fables, of those of La Fontaine. His fables, which are well spoken of by La Harpe, contain some very neat and accurate descriptions; indeed, as a fabulist, La Fontaine is alone his superior. 'Numa' retains its place as a school-book. The translation of 'Don Quixote,' which is a posthumous work, is censured for its want of humour. An honourable trait of Florian deserves to be recorded—he devoted much of the profits of his works to paying the debts of his family.

FLO'RIDA was the name given by Juan Ponce de Lion to the continent of North America, from having discovered it on Palm Sunday (called, in Spanish, Pasqua Florida) in 1512. During a great part of the sixteenth century the southern part of the eastern coast of North America continued to bear this name, which was gradually restricted to that portion of this coast now called Florida. This country at present forms a territory of the United States, and comprehends a peninsula, lying between 25° and 30° 45′ N. lat. and 80° and 83° W. long., besides a tract of land extending along the northern shores of the Gulf of Mexico, between 29° 40′ and 31° N. lat. and 83° and 87° 20′ W. long. The peninsula and adjacent country are called East Florida, and the remainder West Florida; the river Appalachicola being considered as the boundary between them. The length of the peninsula from Cape Sable, its most southern point, to the mouth of St. Mary's River, which divides Florida from Georgia, is 380 miles. Its width between Vacasansa Bay and St. Augustine is about 90 miles, and the breadth is about the same towards its southern extremity; but the central part between Amasura River and Cape Romano is 120 miles wide. The tract along the Gulf of Mexico is nearly 300 miles long from east to west: its width varies between 30 and 70 miles. The whole territory is calculated to be about 55,000 square miles, or somewhat more than that of England.

Opposite the southern extremity of the peninsula there is a series of keys (as they are called, a corruption of *cayos*) and islands, mostly covered with wood. They begin on the west with the Tortugas, and continue for some distance eastward, but afterwards turn to the north-east and north, and terminate at Cape Florida. These islands, which are called the Florida Keys, are skirted towards the south and east by narrow reefs, called the Florida Reefs, and both the Florida Keys and the Florida Reefs may be considered as constituting in this place the left bank of the Gulf Stream, the beginning of which may be fixed between the Tortugas and the coast of Cuba, near the Havanna. The Gulf Stream rapidly increases in velocity, and between Cape Florida and the Bemini Islands sometimes runs five miles per hour. It continues with nearly the same velocity along the eastern shores of Florida up to the mouth of St. Mary's River. The whole of this coast is flat, and skirted by low narrow islands of sand, which lie parallel to the main land, and are separated from it by narrow and shallow lagunes, which cannot be navigated even by vessels of small burden. This coast has no harbours, except at the northern extremity, where that of St. Augustine has 10 feet, St. John 15 feet, and St. Mary's 20 feet water at high tides. The western coast of the peninsula and that of West Florida are also enclosed by elongated narrow sandy islands, though they do not form such a continuous barrier as along the eastern coast, some parts of the west coast being free from them. But this coast also has few harbours. Charlotte Harbour (between 26° and 27° N. lat.) has no great depth of water. Tampa Bay is spacious, and, it is said, admits vessels of considerable burden; but the best harbour is Pensacola, which has 21 feet water on the bar, and from 23 to 36 feet in the interior, which is spacious and convenient. It admits vessels drawing 20 feet, and is the deepest port on the northern coast of the Gulf of Mexico.

The southern districts of the peninsula, as far north as 29° N. lat., are low and flat, being mostly covered with swamps, and containing only moderate tracts of dry land intermixed with the marshy ground. It is in great part devoid of timber, and has only brackish water. The part north of 29° N. lat. has a more uneven surface, but the higher grounds in the interior rarely rise to the elevation of hills. This division contains better water, and is better drained; the swamps are not numerous, and are only of moderate extent. It is besides better wooded, and its soil, though generally sandy, is more fertile; yet in all Florida the proportion of good soil to bad is very small, and cultivation is confined to a few spots of moderate extent. In the northern part limestone is the prevailing rock, and some of the rivers run in different places for some distance under ground.

The climate of Florida is very mild, and in the southern districts hot. South of 28° N. lat. snow is unknown, and frost, though occasional, is rare. The temperature of this tract approaches that of the West Indies. In summer the thermometer generally rises to between 84° and 88°, and in July and August even to 94°. The east side of the peninsula is warmer than the west, which is probably to be attributed to the high temperature of the Gulf Stream. At the equinoxes, especially in autumn, rain falls abundantly every day from eleven to four o'clock for several weeks. At this period strong gales are frequent.

The peninsula is drained by several small rivers, and by the St. John River, whose main branch, the Ocklawaha, rises nearly midway between both seas, and runs north for about 80 miles, when it turns east, and joins the other branch, or proper St. John. Both rivers in their upper course form several shallow lakes, and, after their union, the channel of the river is more like an inlet of the sea, than that of a river, being very wide and nearly without current for the remainder of its course, which rather exceeds 80 miles, and is directed to the north. It is on an average 15 feet deep, and may be navigated some distance above the place where both branches unite.

The St. Mary's River, which, for the greatest part of its course, forms the boundary-line between Florida and Georgia, rises in the latter state near 31° N. lat., and flowing first southward about 40 miles, then turns with a bold sweep northward, in which direction it continues about 30 miles. The remainder of its course lies to the east: where it falls into the Atlantic it forms St. Mary's Harbour, the deepest port in the United States south of the Chesapeake Bay, on the Atlantic coast. The whole course of this river is about 110 miles.

The rivers which fall into the Gulf of Mexico rise either in Georgia or in Alabama. The most eastern is the Suwanee River, which rises in Georgia with two branches, the Alapaha and Suwanee, which unite in Florida and fall into the Gulf of Mexico at the northern extremity of the peninsula of Florida, after a course of upwards of 200 miles. Farther west is the Ocklockonnee, which also rises in Georgia: it runs about 125 miles. The next is the Appalachicola, the largest river of Florida. Its principal branch, the Chatahoochee, rises near 35° N. lat., on the southern declivity of the high table-land of the Appalachian system, and runs first south-west and then south, in which direction it enters Florida, receiving on its boundary the Flint River, which rises between 33° and 34° N. lat., and flows 210 miles before it joins the Chatahoochee. The united river is called Appalachicola, which flows nearly due south more than 70 miles, and is navigable for vessels of considerable burden in all its extent. The united course of the Chatahoochee and Appalachicola is more than 350 miles. The Perdido is a small river, and only remarkable as a political boundary between Florida and Alabama.

Florida has a considerable number of lakes, the largest of which are in the swampy districts of the peninsula. The Lake of Macaco (between 26° and 27° N. lat.) seems to be the most extensive; but its dimensions have not been ascertained. Lake George, which is an expansion of the St. John's River, is 18 miles long and 12 wide; the depth of its water is, on an average, 12 feet. In those districts where the limestone formation prevails there are also numerous lakes; but they are generally of small extent.

The climate of Florida is favourable to the cultivation of most of the productions of the West Indies, where the soil is suitable. The sugar-cane may be cultivated successfully in all the maritime parts, where the orange also, the lime, and the shaddock succeed. Cotton, rice, indigo, tobacco, Indian corn, and a great variety of fruits compose the most important cultivated vegetables of Florida. The pines cover a great part of the northern districts, but the forests contain many other valuable trees.

Wild quadrupeds of the larger description are not numerous, except deer. Alligators, turtles, and snakes are very common. Fish is extremely abundant, and of great variety. Coal and iron ore are said to abound in some places.

According to the census of 1830, the population of Florida consisted of 19,210 free people and 15,510 slaves. This scanty population of so extensive a country is explained by the circumstance of the inferior quality of its soil. But it must also be observed, that a large portion of the peninsula, along its western coast, is still in possession of an Indian tribe, the Seminoles, a branch of the once great and numerous nation of the Creeks. The number of individuals composing this tribe is said to exceed 12,000. Two or three years ago they destroyed several plantations of the whites; and when an armed force was sent against them it was impossible to discover their lurking-places. This war is still going on, but is not maintained with vigour; and it is probable that the Seminoles will keep possession of their territory, as it does not contain any extensive tract fit for cultivation.

Florida not having been received into the Union as a state, is only a territory, and in that capacity sends a delegate to Congress. Its capital, Talahassee, a few miles from the river Ocklackonnee, contains about 1200 inhabitants. The most important town is Pensacola, built on the bay of the same name: yet its population does not much exceed 2000 souls. St. Augustine, on the shores of the Atlantic, has about 2000 inhabitants. In its neighbourhood two settlements of Greek emigrants were established by the English, called Anastasia and New Smyrna; but they no longer exist. Farther north is the fertile island of Amelia, on which is a small town called Fernandina.

Florida was discovered by the Spaniards in 1512; the first Spanish settlement was formed in 1565 at St. Augustine, which town, therefore, may be considered as the oldest European settlement on the North American continent, except those on the Mexican isthmus. The Spaniards kept possession of Florida till 1763, when it was ceded to England. It was retaken by the Spaniards in 1781, and remained in their hands at the peace of 1783. In 1819, the United States, being desirous of possessing a country which, by its vicinity to the Gulf Stream, seems to give its possessors a great command over the navigation between Europe and the countries lying about the Gulf of Mexico, entered into a negotiation with Spain for the cession of Florida; and a treaty to that effect was ratified by Spain in 1821 The Spanish government, however, was not inclined to cede the country; but the feebleness to which it was then reduced rendered it incapable of any resistance, and in 1821 it was taken possession of by General Jackson, by order of the government of the United States. During the administration of Mr. Jefferson two millions of dollars were appropriated for the purchase of Florida; but the negotiation at that time was not completed.

FLORIN. [MONEY.]

FLORUS, LUCIUS ANNÆUS, a native of Spain, or, according to others, of Gaul, lived under Trajan and Hadrian. Some have supposed him to be the same as Lucius Julius Florus, who lived under Augustus, and to whom Horace has addressed two of his Epistles; but as, in the proemium to his history, Florus speaks of Trajan, he cannot be the same person as Lucius Julius, unless we suppose the passage to be interpolated. This question has been discussed by Titze, *De Epitome Rerum Romanorum*, 1804. Others have supposed Florus the historian to be the same as Julius Florus or Floridus, who lived under Hadrian, and wrote the 'Pervigilium Veneris,' a pretty poem in imitation of Horace's 'Carmen Seculare;' but the identity of the two writers is very doubtful. Lucius Annæus Florus wrote a small work entitled 'Epitome de Gestis Romanorum,' in 4 books, from the foundation of the city to the closing of the Temple of Janus by Augustus. The author compiled his epitome from Livy and from other historian whose works are lost. It is meagre and declamatory, and is less a history than a panegyric of the Roman people. Florus is also incorrect in his chronology and geography. It must be observed, however, that the text, as we have it, is corrupt and interpolated. The work is of some use as a kind of substitute, however poor, for those books of Livy which are lost. Some MSS. attribute to Florus also the Epitomæ, or heads of contents, of the books of Livy.

FLOS FERRI. [ARRAGONITE.]

FLOTSAM, or FLOATSAM, is such portion of the wreck of a ship and the cargo as continues floating on the surface of the water. Jetsam is where goods are cast into the sea, and there sink and remain under water; and ligan is where they are sunk in the sea, but are tied to a cork or buoy, in order that they may be found again.

These barbarous and uncouth appellations are used to distinguish goods in these circumstances from legal wreck, in order to constitute which they must come to land.

Flotsam, jetsam, and ligan belong to the king, or his grantee, if no owner appears to claim within a year after they are taken possession of by the persons otherwise entitled. They are accounted so far distinct from legal wreck, that by the king's grant of wreck, flotsam, jetsam and ligan will not pass.

Wreck is frequently granted by the king to lords of manors as a royal franchise; but if the king's goods are wrecked, he can claim them at any time even after a year and a day. (Bl. *Com.*) The same distinction, it is presumed, would prevail with respect to flotsam, jetsam, and ligan.

FLOUNDER. [PLEURONECTIDÆ.]

FLOUR. [WHEAT.]

FLOUR, ST., a town in France, in the department of Cantal, the capital of an arrondissement and the seat of a bishopric. It is on the right bank of the river Lende, a feeder of the Trueyre, which falls into the Lot, one of the principal streams of the system of the Garonne, 289 miles from Paris, on the high road by Moulins and Clermont to Narbonne and Perpignan. This town is said to derive its name and its origin from a bishop of Lodeve, who came into Auvergne to preach, and died there near the end of the fourteenth century, and whose sanctity attracted so great a crowd as to form a town. St. Flour is on the summit of an eminence of basalt about 300 feet high, and enjoys, from its elevated situation, a pure though keen air. The streets are narrow and sombre in their appearance; the houses, which are built of lava and covered with tiles, have a black and dismal look. The cathedral is small, and the promenade (which forms the entrance from Toulouse and Rodez) though tolerable in itself, is not advantageously situated. The population of the town in 1832 was 5813; of the commune 6464. The inhabitants trade in corn and mules; they manufacture linen cloth, ordinary woollens, and glue. In the neighbourhood, but not in the town, metal pots and

pans are made. Many of the tinkers, hawkers, and other industrious itinerants who traverse France, come from the district round St. Flour. There are nine yearly fairs, at two of which a number of mules are sold. The town has a seminary for the priesthood, a high school, and an agricultural society, a small public library, and a philosophical apparatus. The assize court of the department is held here; and there are one or two subordinate courts of justice.

The diocese of St. Flour was established at or near the time of the origin of the town, and comprehended Haute (or Upper) Auvergne; it now comprehends the department of Cantal. The bishop is and always has been a suffragan of the archbishop of Bourges. The arrondissement comprehends 6 cantons and 82 communes, and had in 1832 a population of 64,943.

FLOWER, that part of a plant in which the organs of reproduction are placed. It usually consists of a calyx, a corolla, stamens, and a pistil; but sometimes of only one of the two latter parts; as in the willow and other plants with naked unisexual flowers. In the absence of the stamens and pistil no collection of leaves, whether coloured or not, constitutes a flower. What are termed compound, or more properly composite, flowers, are collections of flowers in a close head, as in the dahlia, and are consequently a peculiar form of inflorescence. [INFLORESCENCE.]

FLOWERS. Lord Bacon (*Essay* 46) calls a garden 'the purest of human pleasures.' Admitting and valuing fully the truth of this assertion, it must be added, that it is also a pleasure which is easily procured, and which lasts throughout a very large portion of the year. In saying that a garden is easily procured, we must be understood to mean a garden in which the objects desired by the cultivator are show, gaiety, and neatness. Where rarity and refinement are wished for, the case is wholly altered; the first can be obtained at a small cost, but there is no limit to the expense of the second. It is of the method of cultivating and displaying flowers in a garden of the less refined sort that we shall now chiefly treat, and we do so because of the great increase of these gardens that is visible: the smallest villa and parsonage, or the larger farm-house, are now rarely without their beds of flowers; and a few hints may be useful to their proprietors. It is obviously desirable, where the varieties of flowers cultivated are few in number, that they should be chosen with regard to the following qualities: the size, the brilliancy, and the smell of their blossoms, the variety of their colours, and more especially the length of time which they continue to blow. This last point is very material, because, if it is disregarded, a large stock of plants will be requisite to keep up a succession, and the labour of planting and replanting, moving and removing, will multiply trouble and expense. As a very large majority of annuals are deficient in this quality, it must be to biennials and perennials that the gardener must chiefly trust. Many of these plants not being sufficiently hardy to stand exposure to an English winter, some shelter must be provided for them during that season. Room for a considerable number may commonly be found in the house of the owner of the garden: they can be placed in windows and in passages, where they will remain in health, if in cold weather the house is continually inhabited. If this cannot be done, shrubby plants may be well, though not so well preserved, by taking them up at the beginning of winter, cutting back the branches, and stowing the roots in a dry cellar, whence they must be taken early in the spring, and potted and watered in a shed-room or very sheltered place to forward them for the summer. The best method of keeping them in the winter (and in this method with care there is no risk whatsoever of loss,) is in a brick pit with two or three glass lights, warmed by a small stove and flue: the cost of building such a pit will usually be about 10*l*. Some breakage of glass must of course be considered as an annual cost. The quantity of fuel used will be too small to take into consideration; a few cinders are all that is requisite. Thousands of plants may be kept in one such pit.

Plants may be multiplied in many ways, by budding, grafting, innarching, by layers, pipings, and cuttings, by suckers, the division of roots and tubers, and by seed; and there are very few species from which by some of these methods an increase cannot be obtained. So easy indeed is the multiplication of plants, and so large a number of new plants can with proper management be raised from one original stock in the course of a year, that the nursery gardeners find it impossible (excepting in rare instances) to maintain a high price for a new flower beyond two or three years: the first year the price of a new flower may be 5*l*., the second it will be about 30*s*., the third year not more than 2*s*. 6*d*. The method applicable to the greatest number of plants, and which is successful with ordinary management, is that of cuttings: from the parent plant small slips or cuttings are taken where the wood is not very tender, and if practicable at a joint. The cuttings should be planted about two inches apart, in large pots or boxes, and the pots placed in a moderately warm hot-bed, shaded from the sun. In about a fortnight they will strike root, and begin to grow. They should then be gradually hardened, be put as far as practicable, into separate pots, and removed into the flue-pit, where plenty of air must be given them in the day-time to prevent their damping off, and a fire be lit before frosty nights: the additional security of mats thrown over the frames must be used when the weather is unusually severe. The time of removing the plants from their winter quarters must depend upon their nature and the climate in which they are to grow. The last week in May or the first in June is the earliest time at which the tenderest will bear a thorough exposure; for one or two previous weeks they should be hardened by gradual exposure to the wind and cold nights, care being taken to protect them with mats if either should be in excess. The cultivation of dahlias is commenced in the second or third week in February, when the roots which have been taken up in the autumn should be put into a hot-bed, kept, as far as practicable, at a uniform heat of 62° to 65°; a little of the earth in the bed should be spread over them, and water liberally given them once a day. The roots will then push out suckers, one from each eye: these should be separated from the bulb: a few fibres of the old root being torn off with them, and being treated after the manner of cuttings, will strike and be ready to plant out at the end of May. It is a fault with gardeners generally that their dahlias flower too late. The first flowers are seldom perfect, and it often happens that the plants have not long reached their prime before they are either pinched by cold nights or perhaps altogether destroyed by frost. It is therefore desirable that the plants should never be checked in the early stages by want of heat or otherwise. Perennial herbaceous plants may be easily multiplied by dividing the roots either in the autumn or in spring. Annuals are principally raised from seed sown in April and May, either upon a hot-bed, from which they must be transplanted, or in the situation in which they are to grow. Sweet-peas and mignonette, nemophylla insignis, poppies, &c., are very shy of being transplanted unless from pots. Mallows, choriopsis, China and German asters, French and African marigolds, eutoca viscida, nolana prostrata, &c., will be better raised on a hot-bed. New annuals are continually produced: we do not however consider them generally as a desirable class of flowers.

There are two methods of arranging flowers with a view to their display—1st, putting each species in a separate bed; 2nd, mixing two or more species in one bed. Each has its merits, and in every garden both should be practised. When flower-beds situated close to each other are to be filled with one species only, it will be requisite to consider the height and colour of the flowers to be planted, that both symmetry and harmony may be preserved. Yellow flowers, especially among those that grow from six inches to two feet in height, are more numerous than flowers of any one other colour, and care must be taken not to plant them in undue proportion. When several species are to be planted in the same bed, the largest bed must be chosen, the tallest species be placed in the middle, and various colours mixed together; sufficient space should be left for each plant to grow freely without interfering with or confusing its branches with those that are next to it. Flowers for the most part like a rich, light, new soil. The spot chosen for a flower-garden should be dry, open to the sun, and sheltered from wind and cold.

Beckman (*Hist. Inventions*) says that it may be asserted with great probability, 'that the modern taste for flowers came from Persia to Constantinople, and thence was imported to Europe for the first time in the sixteenth century. At any rate we find that the greater part of the productions of our flower-gardens were conveyed to us by that channel.' The first public botanic garden in Europe was established at Pisa by Cosmo de' Medici in 1543. The example of Pisa was soon imitated at Padua, Bologna, Florence, Rome, and other cities and universities of

Italy and Germany. The Dutch at this time began to exchange the bulbs for which their gardens were celebrated for the orange-trees of Genoa and Leghorn; Spanish flowers also found their way into Italy, and among them the double night-smelling jasmine, which was so highly prized by the governor of Pisa that he placed a centinel to keep guard over the plant.

The taste for gardens among the French was likewise derived from the Italians. Thus far the taste for flower-gardening had not passed the limits of favourable climates, but it continued to spread into colder countries. Germany and England followed the example of their neighbours. James I. of Scotland wrote of a garden at Windsor Castle, where he was a prisoner in the beginning of the fifteenth century; but gardens at that time were certainly very rare, and seem to have been rather formal shrubberies with clipped yew and other hedges, arbours, and avenues, than gardens containing herbaceous and other flowering plants. The gardens at Nonsuch and Hampton Court were planted in Henry VIII.'s reign; at Hatfield, in Queen Elizabeth's time. Evelyn mentions in his *Diary* the most celebrated gardens of his day: from his account of them it will be seen that flowers were then generally cultivated, and that gardens had become a luxury on which large sums of money were expended. The prices which have been given for flowers at certain periods form a very curious portion of their history. The most curious instance of a mania (it can be called no less) for different species is given by Beckman. (*Hist. Inven.*, vol. i.) In the middle of the seventeenth century tulip roots of particular kinds were greatly sought after, and as their value consequently greatly increased, they became matter of speculation; roots were sold by a weight less than a grain; as much as three, four, and five thousand florins were given for some species; and when once it happened that there were only two roots of a kind called Semper Augustus to be had, the one at Amsterdam, the other at Haarlem, 4600 florins (about 402*l.* 10*s.*), together with a new carriage, two grey horses, and complete harness, were given for one root. Twelve acres of land were offered for a single root, and those who had not ready money promised their movable and immovable goods, lands, cattle, and clothes. The purchaser perhaps did not even receive the root he had bought; he certainly had no intention of cultivating it, and the transactions were purely speculative. This extraordinary system of gambling can only be accounted for by the want of employment for capital. At the present time (1837), though gardens are maintained at a great cost, we do not hear of very large sums being given for individual specimens of whatever species; 60*l.* or 70*l.* is considered a great price for any plant, and is very rarely given. The principal nursery gardeners, and we believe one nobleman distinguished for his love of flowers, employ botanical agents in distant countries; and the varieties of flowers imported from the Cape of Good Hope and South America, and the East and West Indies, have been extremely numerous. (Loudon's *Cyclop. of Gardening.*)

FLUCERINE, the name given to the native deutofluate of cerium which occurs at Finbo and Broddbo, near Falun, in Sweden. It occurs both massive and crystallized. The crystals are either six-sided plates or prisms; they have a yellow or reddish colour; fracture uneven; dull; translucent, in very thin fragments: when heated by the blow-pipe on charcoal it becomes slightly brown, but does not fuse; in the reducing flame it becomes colourless, and in the oxidating flame, with borax and a phosphate, it yields an orange-coloured globule: when heated in a tube with an acid, the glass is corroded.

FLUE. [HOUSE.]

FLUELLITE, a compound of fluoric acid and alumina, which occurs at Stenna-gwyn, in Cornwall, in octahedral crystals, the primary form being a rhombic prism: the crystals are colourless and transparent, with a vitreous lustre. It is extremely rare.

FLUENTS. [FLUXIONS.]

FLUID. This term is applied to substances of which the parts possess perfect mobility amongst themselves, but more rigorously it depends on the relative intensities of the forces which act on the component particles of masses. In bodies of permanent form, denominated solids, these forces not only preserve the particles in a state of rest when undisturbed, but also, on the communication of a slight disturbance relative to their mean positions, reduce them, after the lapse of a very short time, to the places they possessed before; hence arises the permanence of figure and arrangement characteristic of solid bodies. On the other hand, the gases have an elastic or expansive power, which is usually attributed to caloric, because the gaseous state is induced in all substances by the communication of a high degree of heat; the particles of gases have therefore a tendency, when external forces are removed, to fly from their places in obedience to the repulsion exercised by the parts in their vicinity: they are therefore freely moveable amongst each other. But the conditions of the motion of any one particle are nevertheless limited by the condensations of the particles on which they impinge and the rarefactions of those they abandon, and therefore, even in a gas, the disturbance of a particle only makes it describe a curve round its mean position, and the condensations and rarefactions thence generated produce inequalities of pressure which propagate like motions in the particles in the vicinity. These motions, gradually conveyed throughout the entire mass, produce vibrations, the phenomena of sound, and, it is thought, those also of light.

This yielding to the internal forces called into play by the motion of the particles of a gas is by no means opposed to but rather implies their perfect mobility. If we diminish or increase their specific weight by an alteration of temperature, they will accordingly rise or sink amongst the myriads of particles by which they are surrounded. Yet they will not rise or sink as if in vacuo, for they still will be encumbered by the influences of the adjacent particles, and therefore their motions must suffer resistance.

But in liquids, which also come under the denomination of fluids, this alteration of density and elasticity is imperceptible in ordinary motions, from whence, in physico-mathematics, they have been generally treated as incompressible bodies; still a small alteration of specific gravity is sufficient to produce a distinct motion on the particles subject to such change. By the application of a blow-pipe to the lower part of a glass vessel containing any liquid a current, due to the alteration of density of the particles in contact with the heated part of the glass, is generated, and there is much reason to believe that many of the permanent currents of the ocean originate from a similar cause, namely, the unequal temperature of different parts of the bottom of the sea, either from the difference of their depths, or of the conductibility of the solid strata with which the fluid is in contact.

The particles of a fluid being thus surrounded by others which are subject to external forces, such as that of gravity, undergo a pressure which is estimated by considering how great it would be if continued uniform over any surface taken as a unit. The direction of such a surface is immaterial, for the particle can only be in repose when the pressures from all quarters are equal. When fluids are inelastic this pressure is entirely due to extraneous forces, such as the weight of the superincumbent mass; but in elastic fluids, as in air, the pressure is necessarily proportional to the elasticity of the particle which supports it; and this elasticity is known to increase with the diminution of the volume compressed; such fluids therefore, under the influence of external forces, acquire variable densities in their different parts.

We reserve for the articles HYDROSTATICS and HYDRODYNAMICS the principles from whence the equilibrium and motion of fluids are deduced when subject to known forces; and for the article TIDES the case when those forces are the attractions of the sun and moon upon the ocean.

The equilibrium of a body floating on a fluid depends on two simple conditions; namely, that the centre of gravity of the whole body and of the displaced fluid must be in the same vertical line, and the weight of this displaced fluid must be equal to that of the body: but for the conditions of the stability of the equilibrium we refer to METACENTRE.

When a body moves in a fluid it suffers a resistance depending on its velocity; and when the body is small compared with the mass in which it moves the law of resistance is nearly expressed by the square of the velocity. This hypothesis was originally formed by considering that the number of particles on which the moving body impinges in a given time is nearly proportional to its velocity: we say nearly, because the particles which have been struck form returning currents which interfere with this simple law; and, secondly, that the force with which it impinges is also as its velocity, which must be modified from the same consideration. The nature of these currents has not been yet

investigated, and therefore the law of the square of the velocity is adopted generally as a first approximation, but the discovery of the true law would appear to be within the limits of calculation without aid from experiment, and is a subject worthy the attention of physical mathematicians.

"The resistance of bodies only partly immersed in fluids, and having a depth bearing a sensible ratio to that of the fluids, as in barges towed along canals, is subject to laws far different from those which we have considered, for the quantity immersed is itself a function of the velocity, diminishing considerably with great velocities: thus, notwithstanding the increase of resistance due to velocity, this diminution due to less immersion permits the possibility of a minimum resistance. This important subject will be further considered in the article HYDRAULICS.

The term fluid has been extended to the supposed media through which the forces of electricity, galvanism, and magnetism act, but little that can be relied upon has been deduced from by their supposed analogy with material fluids. A surer source of calculation is found in detecting the laws of their elementary actions by experiment; and indeed this process seems to point out the most feasible methods for discovering the molecular laws even of material fluids, manifested both in their tenacity and their capillary phenomena.

Fluidity cannot be easily defined in the explicit terms of its exact causes until more is known of the true laws of the forces which govern the internal arrangement of bodies; but taking the effect, we may with Laplace say, that 'mobility is the characteristic property of fluids.' Hence fluidity may be rendered imperfect by the admixture of solids with fluids, as in mud, &c. The effects of fluidity become still more concealed in masses consisting of heterogeneous solids holding fluids in their pores, as in moist clays, dough, &c.; nor are they fully developed in solids which, through the action of heat, are tending to a fluid state, as in melting tallow, wax, glass, &c. In none of these cases can the laws of perfect fluids be applied; but as they belong only to states of transition, their peculiar laws do not deserve, or at least have not obtained, much consideration.

FLUIDITY. All ponderable matter exists either in the gaseous, fluid, or solid state; and most solids, when heat is applied to them, may be rendered fluid, or converted into liquids, under which circumstances mutual repulsion of particles takes the place of cohesion. The degree of heat required to produce this effect is different in different solids, but, *cæteris paribus*, it is always the same in the same solid: in many cases the transition from the solid to the fluid form is sudden, while in other instances solids pass through various degrees of liquidity before they become perfectly fluid. Of the first mode of becoming fluid ice and the metals are examples, and wax or tallow of the second.

As most solid bodies may be rendered fluid by heat, so many gaseous and fluid bodies are converted into solids by diminishing their temperature. Solid bodies in becoming fluid render latent a large quantity of heat; and on the other hand, fluid bodies in becoming solid evolve much sensible heat. The heat which is requisite to the fluid existence of a body is termed the *heat of fluidity*. These facts are proved by two simple experiments. Mix a pound of water at 32° Fahr. with a pound of water at 172°, and the resulting temperature will be the mean, or 102°. If a pound of ice at 32° be dissolved in a pound of water at 172°, the solution will not have the mean temperature of 102°, but only 32°. As, then, the pound of ice, by being rendered merely fluid, absorbs 140° of heat, so the quantity of heat which becomes sensible when a pound of water at 32° is converted into ice at 32° amounts also to 140°. The actual quantity of heat rendered latent by different fluids as they liquefy depends upon the nature of the substance; thus, according to Dr. Irvine, the under-mentioned bodies contain the annexed quantities of heat when rendered fluid:—

Sulphur	143·68° Fahr.
Spermaceti	145
Lead .	162
Bees' wax	175
Zinc . .	493
Tin . .	500
Bismuth .	550

The nature of fluidity will be further considered when HEAT is treated of.

FLUOBORIC ACID GAS, or FLUORIDE OF BORON, was obtained by Gay-Lussac and Thenard by heating a mixture of fluor-spar, or fluoride of calcium, and vitrified boracic acid. In this operation the oxygen of the boracic acid probably combines with the calcium of the fluoride of calcium and converts it into oxide of calcium or lime, and the fluorine and boron then uniting form the gas in question. The properties of this gas are, that it is colourless, has a pungent odour, is deleterious to animals, and extinguishes flame. It reddens litmus paper strongly; and when bubbles escape into the air, they combine with its moisture and produce a very white dense fume. The specific gravity of this gas is stated differently, from 2·31 to 2·371. It consists, according to Dr. Thomson, of—

One equivalent of fluorine	18
Two equivalents of boron	16
Equivalent	34

Water dissolves about 700 times its volume of this gas. The solution is caustic, and emits fumes, and was found by Berzelius to contain boracic and hydrofluoric acids, probably derived from the decomposition of water, which supplied oxygen to the boron and hydrogen to the fluorine. This solution does not act upon glass, nor does the gas itself; but they readily decompose animal and vegetable substances. Thus, a piece of paper put into the jar of the gas over mercury is decomposed and charred as if burnt, by the abstraction of the elements of water from it, for which the gas has so powerful an affinity. When potassium is put into this gas it burns, and a brown compound of boron and fluoride of potassium is obtained.

This compound acid combines with certain bases, as ammonia, to form salts, which are termed *fluoborates*; but they are quite unimportant.

FLUOR SPAR, *Fluor, Fluate of Lime*, is a well-known mineral, which occurs in many parts of the earth, but especially and in great plenty in Cornwall, Derbyshire, and Durham. It occurs both crystallized and massive. The primary form of the crystal is a cube, the cleavage is parallel to the planes of the regular octahedron, distinct, but seldom with perfect surfaces: it assumes a vast number of secondary forms, as the octahedron, rhombic dodecahedron. The late W. Phillips mentions his possessing at least 70 beautiful varieties of form, and he has figured a fragment of a crystal from Devonshire which if it were perfect, would exhibit 322 planes. It occurs colourless, and of almost every colour, as grey, purple, black, brown, red, yellow, green, and blue: in Derbyshire the last is the prevailing tint, and the massive fluor of that county is termed by the miners *Blue John*. It is frequently transparent, but more commonly only translucent; its lustre is vitreous; specific gravity 3·14; hardness 4·0; streak white, or slightly coloured; fracture conchoidal: when powdered and thrown on a hot coal, fluor spar exhibits a phosphorescent light, which is blue, green, purple, or yellow; when thrown in mass into the fire, it decrepitates. The massive varieties are nodular or amorphous: the structure of the former is large fibrous, or columnar, with divergent fibres: the structure of the amorphous variety is crystalline, granular, earthy, compact, and occasionally straight or curved laminar: the crystallized varieties are more common in Cornwall and the west of England, the massive in Derbyshire and the north of England. It occurs in many places on the Continent also.

Fluor spar is, strictly speaking, to be considered as a fluoride of calcium, composed of

One equivalent of fluorine	18
One equivalent of calcium	20
Equivalent . . .	38

The blue and variegated fluor spar of Derbyshire is turned into various ornamental forms, candlesticks, &c.; that of Cornwall is used as a flux in the reduction of copper ore.

FLUORIC ACID. [HYDROFLUORIC ACID.]

FLUORINE, a substance which, though long known in combination with other bodies, has been only lately procured in an insulated state, if indeed as much as this can be said, and its properties in a separate state are consequently very imperfectly known. It was first obtained, or at any rate supposed to be obtained, in a separate form by Baudrimont, by passing fluorboric acid over deutoxide of lead, heated to redness: the gas was received in a dry vessel,

He has since employed a mixture of sulphuric acid, peroxide of manganese, and fluoride of calcium; and although the product is mixed with hydrofluoric and fluosilicic acid gases, their presence did not prevent some of the properties of fluorine from being observed. The rationale of this operation is evidently similar to that of obtaining chlorine from chloride of sodium; the calcium of the fluoride takes oxygen from the peroxide of manganese, and the fluorine is set free in the elastic state. It appears to be a gas of a yellowish-brown colour; its odour resembles that of a mixture of chlorine and burnt sugar, and, like chlorine, it has the power of destroying colour: it does not act upon glass. These experiments have been confirmed by the more recent results of Messrs. Knox. Like chlorine and oxygen, it appears to have a powerful affinity for metallic bodies and for hydrogen: with this latter it forms hydrofluoric acid.

The compounds which contain fluorine, when they do not possess acid properties, are termed *fluorides*; thus, as already mentioned, the fluor spar, so well known in Derbyshire, is termed chemically *fluoride of calcium*. The equivalent or combining weight of fluorine is a subject on which chemists differ, Dr. Thomson making it 18, while Berzelius considers it as only 9·37.

FLUOSILICIC ACID is prepared by mixing equal quantities of fluoride of calcium and silica with three times their weight of sulphuric acid in a retort; on the application of a moderate degree of heat action takes place; and it appears that the oxygen of the silica is transferred to the calcium of the fluoride and converts it into lime, which combining with the sulphuric acid forms sulphate of lime, while the fluorine and silicium set free combine to form fluosilicic acid, which rises in the gaseous state, and is to be received in very dry air-jars filled with and inverted in mercury.

The gas thus obtained is colourless, its odour is peculiar, suffocating, and acid, and it fumes on coming into contact with the moisture of the air, but much less so than fluoboric acid gas. Its specific gravity, according to Dr. Davy, is 3·600, while Dumas makes 3·574. It suffers no change by exposure to a high temperature, and it has not been liquefied by condensation. It is absorbed and decomposed by water, of which it also decomposes a portion, and the results are hydrofluoric acid and silica, from the union of fluorine with the hydrogen of the water, and the silicium with the oxygen.

When potassium is put into this gas, it inflames and burns at a certain temperature. When the gas is passed over iron heated to whiteness, there is formed an extremely thin coating of fluoride of iron and silicium, and the gas then passes without further alteration.

It does not decompose the alkaline carbonates when dry at common temperatures, nor is it absorbed by them, however long they may remain in contact; most hydrated oxides however absorb it without the assistance of heat.

Fluosilicic acid condenses double its volume of ammoniacal gas, and forms with it a volatile fluosilicate, which is a salt of no importance; when it acts upon metallic oxides both are decomposed, the results being silica and metallic fluorides.

It has been mentioned that this gas is decomposed by and decomposes water: the hydrofluoric acid remains in solution with a portion of the silica, while another part of it is precipitated in the state of hydrate; the solution is very sour to the taste, and reddens litmus paper strongly, and decomposes alkaline carbonates with effervescence. This solution has been called hydrofluosilicic acid.

Fluosilicic acid is probably composed of

One equivalent of fluorine . . .	18
One equivalent of silicium . . .	8
Equivalent .	26

FLUSHING, or **VLISSINGEN**, a town and fortified port on the south coast of the Island of Walcheren, in the province of Zealand. It is situated at the north side of the Schelde, the passage of which it defends, and lies in 51° 25′ N. lat. and 3° 30′ E. long., 8 miles south of Middelburg, and 17 miles north-east from Sluis. The port is formed by two moles, which break the force of the sea, and beyond these are two canals which enter the town, in the interior of which they form two perfectly-secure basins; one of them is of considerable size, and has sufficient depth of water to receive the largest ships of war. Flushing came into possession of the French in 1795, and was much used by them as a place of rendezvous for their fleets. The batteries by which the port is defended command to a great extent the south entrance to the Schelde. The town is well built, and the population is above 6000. It was besieged in 1809 by the English expedition under Lord Chatham, well known as the Walcheren expedition, and was taken, but evacuated very shortly after, the port and town having been much damaged by the English. Flushing has always had much notoriety as the place of resort of English smugglers.

FLUSTRA. [Cellariæa, vol. vi., p. 401.]

FLUTE, a well-known musical instrument, the use of which, under different forms and names, may be traced to the remotest periods of antiquity. Most of the antient poets ascribe its invention to no less personages than gods and goddesses. Even the grave Plutarch, in his dialogue Περὶ Μουσικῆς, attributes it to Apollo. Lucretius, however, contents himself by deriving its origin from the breathing of western winds over certain reeds, and thus, he tells us, was suggested to man the rural pipe, a simple tube, which the ingenuity of later ages has improved into one of the most elegant and fascinating instruments that art can boast. The word is said to be derived from the Latin *Fluta* (lamprey), a kind of eel which has seven holes lengthways in its side, and when extended resembles a very narrow flute.

The antient flute had some sort of mouth-piece; it was double as well as single—that is, was often composed of two tubes, both played together, and hence it has not unreasonably been inferred that the enlightened nations of antiquity possessed some knowledge of harmony. There is a figure of an antient flute-player, or of Pan, in the Townley Gallery of the British Museum (Lib. of Entertaining Knowledge, *Townley Gallery*, vol. i., p. 189). The flute was almost universally employed by the Greeks, Romans, &c., not only in their temples, theatres, social entertainments, and armies, but also in their funeral ceremonies. It even may be said to have accompanied their public orations, having frequently been employed for the purpose of keeping the voice up to a proper pitch. From the custom of introducing it in the last offices for the dead arose the saying, *Jam licet ad tibicines mittas* (you may now send for the flute-players), when any one was *in articulo mortis*—in the last agonies.

Of the old English flute—for the invention whereof Mersenne erroneously gives this country the credit—we will say a few words. It was not unfrequently called the *Flute à bec*, from the resemblance of the mouth-piece to the beak of a bird. This mouth-piece was at the upper and wider end, and the instrument was held in the manner of the oboe and clarinet. It had seven finger-holes, no keys, and was commonly adapted either to the scale of C or F. The *Flute à bec* was gradually superseded by that now in use, which long was known as the German Flute—the *Flute Traversière*, or horizontal. This, at first simple in construction, limited in means, in length about a foot and a half, and having only one key, has by degrees been extended to twenty-seven inches, occasionally more, and has sometimes as many as a dozen keys, seldom less than six; so that every kind of music, however chromatic, within its compass, and adapted to the nature of a tube, may now be executed on this instrument. It is formed of any kind of hard wood, of ivory, and even of glass, and is divided into four joints. The scale of the concert flute is from C below the treble staff to C in the altissimo:—



Some flutes are made to go four notes lower; and an adroit player can reach the E♭ in altissimo:—



The high notes of the flute are very effective in the orchestra, but its best, its expressive tones, are those between the low C and G in alt, comprising twelve diatonic degrees, and all the intermediate semitones. Performers on the flute, however, 'like those on most other instruments, now strive to astonish rather than please their auditors.' Tasteless, senseless execution is all-prevailing, a fact which the great majority of hearers most willingly admit, and much deplore, while they nevertheless encourage the debasement of one of the most delightful of arts by patiently listening to, and often applauding, that which at best only excites some little wonder, never affords heart-felt pleasure, and most commonly is the source of dissatisfaction, if not of a feeling nearly allied to disgust.

The OCTAVE FLUTE (called also the *Flauto Piccolo, Ottavino*, and *Flautino*, in orchestral scores) is a small instrument an octave higher than the common flute; it is shrill and piercing, and only desirable in the fullest instrumental music, and in military bands. The best of these are provided with four keys.

FLUTE-STOP, on the organ, is a range of wooden pipes, tuned in unison with the diapason, and generally proves a most successful imitation of the instrument whence its name is derived.

FLUTE, FLUTINGS. [COLUMN.]

FLUX, in chemistry and metallurgy, is any substance employed to assist the reduction of ores or metallic compounds to their metallic state. In smelting the argillaceous iron ore of this country, which is a mixture of carbonate of iron, alumina, and silica, the flux employed is limestone, in such proportions as will form a slag that melts easily, so as to allow the fused iron to sink through it. When the proportion of limestone has been properly adjusted, the slag has the appearance of green bottle-glass; when, on the other hand, the slag is opaque and blue, it is a sign that a good mixture has not been made.

When copper ores are difficult to melt, fluor spar is added as a flux, which appears to promote the operation.

The fluxes made use of in assays and in chemical operations vary greatly according to the nature of the metal to be reduced and that of the substances combined with it. [ASSAYING.]

We shall mention a few of the more important fluxes employed.

Black flux is made by mixing one part of powdered nitre with two parts of powdered argol, which is the commercial name for impure cream of tartar, or bitartrate of potash; this mixture is to be gradually thrown into a red-hot earthen crucible so as to deflagrate it, taking care not to make the heat so high as to fuse the mixture.

In this case the nitric acid of the nitre is decomposed, its oxygen acts upon the carbon of the tartaric acid, carbonic acid is formed, and this uniting with the potash both of the nitre and bitartrate is converted into carbonate of potash; the whole of the carbon of the tartaric acid is not however so acted upon, and the excess remains mixed with the carbonate of potash in the state of finely-divided charcoal. This flux should be immediately reduced to powder and kept in a well-stopped bottle, otherwise it will become damp by the absorption of moisture, to which the carbonate of potash is subject.

This flux is doubly useful; the carbonate of potash combines with the earthy parts of the ore, such as silica and alumina, while the charcoal unites with the oxygen of the metallic oxides, and carbonic acid being formed and expelled, the metal is reduced and melts. This flux is especially useful in the process of detecting arsenious acid and reducing it to the metallic state.

White flux is a carbonate of potash made by deflagrating equal weights of nitre and bitartrate of potash; the quantity of this last salt being smaller than that in black flux, there is no excess of charcoal furnished by tartaric acid. It appears to possess therefore no advantage over common carbonate of potash, and either of them may be employed in reducing metallic chlorides, such as that of silver, to the metallic state. White flux, or carbonate of potash, disintegrates stony matter, as alumina and silica, separates acids and sulphur from metals, and dissolves many metallic oxides; having however no charcoal in its composition, it does not reduce metallic oxides as the *black flux* does.

Argol, already described as an impure bitartrate of potash, powdered and mixed with the pulverized substance to be reduced, is sometimes advantageously used as a flux; owing to the intimate mixture of the charcoal and potash in this flux a good deal of potassium is evolved, and upon the reducing property of this metal the reduction of the oxides of other metals frequently depends to a considerable extent.

Charcoal alone is, in the case of pure oxides, sometimes employed as a flux; thus a crucible lined with charcoal is useful for the reduction of oxide of iron, or the oxide may be mixed with charcoal.

There are some bodies which are even more efficient than charcoal in certain cases, such as wax, fat, oil, tar, and pitch, and gum, sugar, or starch; these may be intimately mixed with the substance to be reduced, and they not only contain carbon in a form which is readily developed, but also hydrogen, which is likely to assist in the separation of the oxygen from metallic oxides.

Flint glass is sometimes, but improperly, used as a flux, for it contains much lead that may greatly interfere with the results produced.

Green bottle-glass has also been used for this purpose, but it is objectionable on account of its containing iron, and it even yields traces of silicium and aluminum to iron which was pure before being heated with it.

FLUXIONS, FLUENTS, METHOD, NOTATION, AND EARLY HISTORY. The method of fluxions assumes a distinct conception of velocity, both in the case of a uniform and variable motion. It further extends this notion of velocity or rate of increase, derived from the consideration of a moving point, to all species of magnitudes, and even to expressions which are purely numerical, as the formulæ of algebra. If one magnitude depend on another for its value, so that a change in the first produces a change in the second, and if the first be imagined to increase at a uniform and given rate, then the second will also increase or decrease, but not at a uniform rate, unless the second magnitude y be determined from the first x by an equation of the first degree, $ax \pm by \pm c = 0$. But the rate at which y increases, though varying with the values of x, can in all cases be determined; and, supposing $\dot{x}$ to be the velocity with which x increases, and $\dot{y}$ that of y, an equation can always be produced of the form

$$\dot{y} = \left\{ \begin{matrix} \text{a function of } x \text{ and } y\text{, depending on} \\ \text{the equation which connects them} \end{matrix} \right\} \times \dot{x}.$$

In this case y and x were called by Newton *flowing* quantities, and $\dot{x}$ and $\dot{y}$ were called their fluxions: conversely y and x were called the *fluents* of $\dot{y}$ and $\dot{x}$. Thus when $y = x^3$ it may be shown that $\dot{y} = 3x^2\dot{x}$, and if $x = 10$, $\dot{y} = 300\,\dot{x}$, or if the number be increasing continuously, then the increasing number being 10, its cube is increasing 300 times as fast as itself. Thus while a number changes from 10 to 10·01, its cube changes from 1000 to 1003·003001, and 3·003001 is 300·3001 times as great as ·01. That this is not exactly 300 arises from the rate of increase of x^3 not being uniform when that of x is uniform. [VELOCITY.] The velocity of y being variable, may itself be considered as having a rate of change. Thus, if the velocity of a body increase uniformly, the whole velocity gained in a second may be called the velocity of the velocity, or the fluxion of the fluxion. Thus if x increase uniformly, the velocity of $\dot{x}$ is nothing, or $(\dot{x})^{\cdot} = 0$, but if $y = x^3$ then $(\dot{y})^{\cdot} = 6x\dot{x}^2$. Newton denoted these second fluxions by $\ddot{y}$ and $\ddot{x}$. In a similar way might be determined the velocity of $\ddot{y}$, denoted by $\dddot{y}$, and so on. We cannot find that Newton proposed any symbol for the fluent of a fluxion except the enclosure of its expression; thus,

$$\boxed{3x^2\dot{x}} \text{ is the fluent of } 3x^2\dot{x}, \text{ or } x^3.$$

He also, in his treatise 'De Quadratura Curvarum,' used z' to stand for the fluent of z.

We now come to the history of this discovery, and of the dispute relative to the right of invention. We have already given a brief outline of the circumstances which led to the publication of the COMMERCIUM EPISTOLICUM, and we shall now add the previous and subsequent occurrences, with some quotations from authorities.

The biographers of Newton state, that about the year 1663 he began to turn his attention to the writings of Descartes and Wallis, and Newton himself testifies that he invented the method of series and fluxions in the year 1665; and that in a tract written in 1666 he had begun

to use the notation of fluxions. In 1669 Barrow communicated to Collins the tract of Newton, afterwards published under the title of *De Analysi per Equationes numero terminorum infinitas*; of which he afterwards says, 'I am glad my friend's paper gives you so much satisfaction: his name is Mr. Newton, a fellow of our college, and very young (being but the second year Master of Arts), but of an extraordinary genius and proficiency in these things.' This tract contains a method of series, and many problems solved by application of limits to differences obtained by expansion; but no direct method of fluxions. It was first published in the Commercium Epistolicum. Various letters of Newton, Collins, and others, up to the beginning of 1676, state that the first-named had invented a method by which tangents could be drawn, &c., without the necessity of freeing their equations from irrational terms. Among them is a letter of Newton to Collins, dated December 10, 1672, in which he states the fact of his discovery, with one example. This letter the committee [COMMERCIUM EPISTOLICUM] assert to have been sent to Leibnitz, but without proof. Leibnitz desired to have this method communicated to him; and Newton, at the request of Oldenburg and Collins, wrote to the former the celebrated letters of June 13 and October 24, 1676. In the first he states the binomial theorem, and various consequences of it in combination with his method, but without giving any information as to that method. Leibnitz in a reply, also addressed to Oldenburg, speaks in the highest terms of what Newton had sent, and requests further explanation. Newton, in the second letter just mentioned, then explained how he arrived at the binomial theorem [BINOMIAL THEOREM], and gives various results of his method. He also communicated his method of fluxions and fluents *in cipher* (as was often practised at the time), if cipher it could be called, which had no method by which it could be decyphered. It consisted in placing in alphabetical order all the letters in the sentence communicated. Thus Newton gravely tells Oldenburg that his method of drawing tangents was

6accdæ 13eff 7i 3l 9n 4o 4qrr 4s 9t 12vx;

or, that if any one could arrange six *a*s, two *c*s, one *d*, &c., into a certain sentence, he would see the method. That sentence was, Data Æquatione quotcunque fluentes quantitates involvente fluxiones invenire, et vice versa. If Leibnitz could have taken a hint either from the preceding letters in alphabetical order, or (had he known it) in their significant arrangement, he would have deserved as much credit for his sagacity as if he made the invention independently. We cannot find anything in the rest of the letter which could give any such hint; and certainly Newton, who showed himself desirous to conceal the method, and knew that his letter was to come under the acute eye of Leibnitz, did not imagine that he had in any part of it betrayed his secret. This letter, of October 24, 1676, had not been sent to Leibnitz, March 5, 1677, as Collins informs Newton by letter of that date. So early as June 21, of the same year, however, Leibnitz had received that letter and written an answer to Collins, in which, without any desire of concealment, he explains the principle, notation, and use of his differential calculus: this letter was published in the 'Commercium Epistolicum.' It is of this correspondence that Newton wrote the celebrated scholium; of which, as we shall see, he was afterwards weak enough, first, to deny the plain and obvious meaning, and secondly, to omit it entirely from the third edition of the 'Principia.' This scholium*, very literally translated, is as follows (book ii. prop. 7, scholium).

A.D. 1687. 'In letters which went between me and that most excellent geometer, G. G. Leibnitz, ten years ago, when I signified that I was in the knowledge of a method of determining maxima and minima, of drawing tangents, and the like, and when I concealed it in transposed letters involving this sentence (Data æquatione, &c., above cited), that most distinguished man wrote back that he had also fallen upon a method of the same kind, and communicated his method, which hardly differed from mine, except in his forms of words and symbols.'

It will be convenient here to give Newton's subsequent explanation, given in the year 1716, taken from his remarks on Leibnitz's letter to Conti of April 9, 1716, published in 1716 in the appendix to Raphson's 'History of Fluxions.'

'He pretends that in my book of principles I allowed him the invention of the calculus differentialis, independently of my own; and that to attribute this invention to myself is contrary to my knowledge there avowed. But in the paragraph there referred unto I do not find one word to this purpose. On the contrary, I there represent that I sent notice of my method to Mr. Leibnitz before he sent notice of his method to me: and left him to make it appear that he had found his method before the date of my letter; that is, eight months* at the least before the date of his own. And, by referring to the letters which passed between Mr. Leibnitz and me ten years before, I left the reader to consult those letters† and interpret the paragraph thereby. For by those letters he would see that I wrote a tract on that method and the method of series together, five years before the writing of these letters; that is, in the year 1671. And these hints were as much as was proper in that short paragraph, it being besides the design of that book to enter into disputes about these matters.'

Nothing material passed till 1684, in which year Leibnitz gave his first paper on the Differential Calculus in the Leipzig Acts. In 1687 the Principia was published by Newton; and Leibnitz continued to give papers on the subject of his new Calculus. The Bernoullis began to cultivate the subject about the year 1691, and as they were on terms of correspondence with Leibnitz, he was the source from whence they drew, and to which they returned, additional ideas on the subject. The Marquis De L'Hôpital was employed in writing his elementary treatise (the first written), which was published in 1696. All these considered Leibnitz as their chief; and the consequence was that Dr. Wallis informs Newton, by letter of April 10, 1695, that 'he had heard that his notions of fluxions passed in Holland with great applause by the name of Leibnitz's Calculus Differentialis.' Accordingly Wallis, who had just completed printing the first volume of his works (the third, which contains Newton's letters to Oldenburg, having been previously printed) inserted in the preface, as a reason for not mentioning the Differential Calculus, that it was Newton's method of fluxions which had been communicated to Leibnitz in the Oldenburg Letters. A review of Wallis's works, in the 'Acta Eruditorum, or Leipzig Acts,' for 1696, reminds the reader of Newton's own admission above cited. On this Newton (Raphson, supplement above cited) remarks, 'Whether Mr. Leibnitz invented it after me, or had it from me, is a question of no consequence, for second inventors have no right.'

In 1699 Fatio de Duillier, a Genevese, settled in England, stated in a mathematical work his conviction that Newton was the first inventor, adding that he left it to those who had seen the manuscripts and letters to say whether Leibnitz borrowed from Newton. This was the first distinct suspicion of plagiarism; and Leibnitz, who had never contested the priority of Newton's discovery, and who appeared to be quite satisfied by Newton's admission, now appears, for the first time, in the controversy. In a reply to Duillier (Leipzig Acts, 1700) after calling attention to Newton's scholium, he declares that when he published his method, in 1684, he knew nothing more of any method of Newton, except that the latter had written to him that he could dispense with the removal of irrational terms: and that, though on the publication of the Principia he became aware how much further its author had pushed his discoveries, he did not know that Newton possessed a *Calculus* (or organized method) like the Differential, till the publication of Wallis's preface.

The 'Quadrature of Curves' was published by Newton in 1704 at the end of his Optics. It contains a formal exposition (the first published) of the method and notation of fluxions. Since so great a stress was laid by the parties to the quarrel on the introduction of specific notation, we may remark that Newton himself did not very soon adopt such a course. He says that in 1666 he 'sometimes used a letter with one prick for quantities involving first fluxions; and the same quantity with two pricks for quantities involving second fluxions.' Even so late as 1687 he does not (in the Principia) give any notation for the *momenta* to which he had given a name, and (though not laying any stress on it) we doubt whether Newton would ever have systematized his

* In the article COMMERCIUM EPISTOLICUM we have supposed that the committee took no notice of this correspondence. The truth is, that from Newton's expressions we always imagined he referred to some *direct* correspondence which passed between him and Leibnitz, and not to these letters which were *written to Oldenburg*.

* He must have known by Collins's letter that it was not three.

† They had not then been published.

notation if he had not seen the letter of Leibnitz referred to in the scholium.

A review of the above work appeared in the 'Leipzig Acts,' January, 1705, in which, after stating that the Differential Calculus had been explained in that work by Leibnitz, its inventor, and further by the Bernoullis and De L'Hôpital, the author proceeds as follows: 'Instead of the Leibnitian differences Newton applies and always has applied (adhibet semperque adhibuit) fluxions, which are *quam proximè* as the increments of flowing quantities generated in infinitely small times, and has used them with elegance both in his Principia and in subsequent writings, just as (quemadmodum et) Fabri in his synopsis has substituted (substituit) motion for the method of Cavalieri.' This was considered by Newton's friends as an imputation of plagiarism on their chief; but such a construction was always strenuously resisted by Leibnitz. On the one hand it was declared that Newton was represented in the same light with regard to Leibnitz as Fabri to Cavalieri, by the force of 'quemadmodum et:' on the other it was replied that the distinction between separate invention and borrowing was preserved in *adhibuit* and *substituit*. We are inclined to suspect that the meaning of the writer was not very fair. Be this as it may, the preceding sentence called forth the assertion of Keill (*Phil. Trans.*, 1708), that Leibnitz had inserted Newton's method, changing its name and notation, in the Leipzig Acts. The article COMMERCIUM EPISTOLICUM takes up the history at this point.

The 'Commercium Epistolicum' (which was not published for sale, the few copies printed being distributed as presents) did not reach Leibnitz, who was at Vienna, for a considerable time. In the mean while he wrote to John Bernoulli (who had received his copy) for his opinion of the work. This the latter gave, first in a letter to Leibnitz, and afterwards (as Leibnitz asserts) in an anonymous tract published in July, 1713. But, as in this tract the author speaks in complimentary terms of John Bernoulli, it has been supposed that at least it was edited by some one else. This letter is decidedly as unfair towards Newton as the friends of the latter had been towards Leibnitz; it asserts the method of fluxions to be a plagiarism from the Differential Calculus. Keill printed a reply, and Newton and Leibnitz then appear as mutual accusers, in letters to Mr. Chamberlayne. Nothing remarkable arose out of this correspondence, which terminated in the announcement of Leibnitz that he also would prepare a Commercium Epistolicum. About December, 1715, Leibnitz re-opened the matter in a letter to the Abbé Antonio Conti of Venice, then on a visit to England. He there complains of the treatment he had received, and attacks the Newtonian philosophy in general. Newton wrote a reply, February 26, 1715–16, in which he very much dwells on previous admissions made by Leibnitz. The latter, in a third letter to Conti, April 9, 1716, avows that he always believed Newton upon his word, but that, seeing him connive at accusations which he must have known to be false, it was natural that he (Leibnitz) should begin to doubt. Newton is also reminded that he had made some admissions in favour of Leibnitz (in the scholium) which he was now desirous of disavowing. This letter was not sent directly to Conti, but first to Paris, that it might be there seen and copied by a friend: on which Newton refused to send any answer, considering it as an insult that Leibnitz, though he complained of suppressions in the Commercium Epistolicum, should take means to preserve evidence to the whole of his letters. But Newton circulated some remarks among his friends, which he published immediately on hearing of the death of Leibnitz, November 14, 1716. It is in this last paper that the remarkable sentence occurs which we have quoted above in connexion with the scholium which it disavows. Raphson's 'History of Fluxions' being then ready for publication (its title-page bears 1715), or perhaps published, the Conti correspondence was annexed as as a supplement.

The history of the controversy ends with the death of Leibnitz, and we shall conclude this article with a few additional quotations and facts which bear upon the subject.

1. The second letter of Keill (May 24, 1711), [COMMERCIUM EPISTOLICUM] on which the whole of the subsequent dispute arose, was in substance the statement of Newton himself. In the minutes of the Royal Society, April 5, 1711, it is stated that 'the president gave a short account of the matter, with the particular time of his first mentioning or discovering his invention, referring to some letters published by Dr. Wallis: upon which Mr. Keill was desired to draw up an account of the matter in dispute, and set it in a just light.' The letter in question was the consequence, which was read at the meeting of the 24th of May (its date).

2. The committee consisted of Dr. Arbuthnot, Mr. Hill, Dr. Halley, Mr. Jones, Mr. Machin, and Mr. Burnet. This is what Newton calls 'a numerous committee of gentlemen of several nations.' The names of the committee were not published with the Commercium Epistolicum.

3. So far from the committee considering themselves as in any judicial capacity, it appears, from a letter of Burnet above-named to John Bernoulli (which the latter sent to Leibnitz, and the extract is in the published correspondence of the two), that the Royal Society was busy proving by original letters that Leibnitz might have seen the method of fluxions in the correspondence of Oldenburg, &c.

There was throughout the whole dispute a confusion between the knowledge of fluxions or differentials and that of a *calculus* of fluxions or differentials, that is, a digested method with general rules. If the dispute could be revived at the present time, it would be on entirely different grounds: but of course, in describing the controversy as it existed, we need only consider those points which were put in issue by the parties themselves.

FLY, a name applied almost indiscriminately to all insects possessing wings; by many however restricted to the various species of Dipterous insects, an account of which is given under the head DIPTERA.

FLY-TRAP. [DIONÆA.]

FLY-WHEEL. [WHEELS.]

FLYING-FISH. Under the head DACTYLOPTERUS there is an account of certain flying fishes belonging to the order Acanthopterygii: there are, however others, of a different tribe, which have the same appellation, being equally gifted with the power of sustaining themselves in the air for a certain length of time—we allude to the species of the genus Exocetus.

The genus *Exocetus* belongs to the Abdominal Malacopterygii, and forms part of the family Esocidæ. The distinguishing characters are:—pectoral fins nearly equal to the body in length; head flattened above and on the sides; the lower part of the body furnished with a longitudinal series of carinated scales on each side; dorsal fin placed above the anal; eyes large; jaws furnished with small pointed teeth.

The flying fishes when in their own element are constantly harassed by various fishes of prey, and it is supposed that their flights are performed for the purpose of escaping from these enemies: when in the air however they are subject to the attacks of various species of gulls.

Whether these fishes possess the power of flying, in the true sense of the term—that is, by beating the air with their members, or whether their large fins merely serve as parachutes to sustain them in the air for a short time, after a leap from the water, is not yet fully ascertained; observers having given different accounts. The latter is perhaps the prevailing opinion of naturalists, and is that of the more recent observers. 'I have never,' observes Mr. George Bennett, the author of 'Wanderings in New South Wales,' 'been able to see any percussion of the pectoral fins during flight, and the greatest length of time that I have seen this *volatile* fish on the *fin* has been thirty seconds by the watch, and their longest flight mentioned by Captain Hall has been 200 yards, but he thinks that subsequent observation has extended the space. The most usual height of flight, as seen above the surface of the water, is from two to three feet; but I have known them come on board at a height of 14 feet and upwards; and they have been well ascertained to come into channels of a line-of-battle ship, which is considered as high as 20 feet and upwards.' 'But it must not be supposed they have the power of elevating themselves in the air after having left their native element; for, on watching them, I have often seen them fall much below the elevation at which they first rose from the water, but never in any one instance could I observe them rise from the height at which they first sprang; for I regard the elevation they take to depend on the power of the first spring or leap they make on leaving their native element.'

Judging from the foregoing quotation, and several other accounts which we have perused, it would appear that something beyond the mere leap of the fish would be required to account for the great heights (of 14 or 20 feet) at which

these fishes have been seen. If they cannot fly (which one would judge to be the case upon examining the structure and position of the fins) it seems probable that they take advantage of the wind at times, and so adjust their fins that they are carried upwards by it.

Several instances are on record of the appearance of flying fishes off the British coast, but we are not aware what particular species they were. It is probable that both the *Exocetus exiliens* and the *E. volitans* may have made their appearance in our seas; these two species being very abundant, the former in the Mediterranean sea (where many fishes similar to those of our own coast occur) and the latter in the Atlantic ocean.

The *Exocetus exiliens* has the ventral fins placed behind the middle of the body, and the *E. volitans* has the ventrals (which are much smaller than in *E. exiliens*) placed anterior to the middle part of the body: these two species therefore are easily distinguished; of the latter there is a figure in Yarrell's *British Fishes*.

The American seas afford us examples of other species of this genus.

FO, pronounced by the Chinese Füh, is the name by which Buddha is worshipped in China. According to the Chinese authorities quoted in Dr. Morrison's Chinese Dictionary (vol. i. part i. pp. 92, 93), the religion of Fo was introduced into China in the seventh year of the reign of the Emperor Ming, about A.D. 50. Though the Chinese government has usually discountenanced, and at some periods persecuted, the followers of Fo, they have always been very numerous; yet Mr. Davis remarks, in his work on the Chinese (vol. ii. p. 94), that 'the present condition in China of the religion of Fŏ is very far from flourishing; and the extensive and magnificent establishments which have been founded in former times are evidently in a state of dilapidation and decay. It is rarely that one meets with any of their nine or seven-storied pagodas in tolerable repair, though one or two of these striking and elegant objects occur in almost every landscape. Between Macao and Canton there are no less than four or five nine-storied pagodas on elevated points by the river-side, and every one of them is in a state of ruin.' Many interesting particulars respecting the Buddhist religion in China are contained in *The Catechism of the Shamans; or, the Laws and Regulations of the Priesthood of Buddha in China. Translated from the Chinese Original, with Notes and Illustrations, by* Charles Fried. Neumann, London, 8vo., 1831. [BUDDHA.]

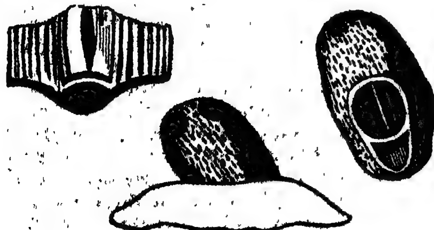
FO-HI, the name of the first emperor of China, is said to have been born in the province of Shensy, and to have reigned B.C. 2952. According to the Chinese historians, Fo hi reclaimed the inhabitants of China from barbarism, established social order, instituted marriage, and taught them the use of writing. Fo-hi and his two successors Shin-noong and Hoang-ti, who are usually termed the 'Three Emperors,' must be considered as belonging to the fabulous part of Chinese history. He is said to have been the author of one of the canonical books of the Chinese, called 'Yĕ-king.' (Du Halde's *Description de l'Empire de la Chine*, vol. i. p. 266-269; vol. ii. p. 344-353.)

FOCKSHAN or FOCZANY. [MOLDAVIA.]

FOCUS (Geometry). [ELLIPSE, HYPERBOLA, PARABOLA.]

FOCUS (Optics), the point at or near which rays are collected by a lens or mirror. Its distance from the lens or mirror is called the focal length. [LENS; MIRROR.]

FO'DIA, a genus of mollusks established by Bosc, and generally arranged by zoologists at the end of the *Simple Ascidians*, and next to *Bipapillaria*; nor is it better known than the last-named genus.



Fodia rubescens.

Generic Character.—Animal oval, mammillated, divided throughout its length by a vertical partition which contains the stomach, into two unequal tubes, opening at each extremity by an orifice, the upper one being a little sunk, and irregularly dentated, and the lower edged by a circular border forming a kind of sucker (ventouse), and serving to fix the animal.

Bosc founded the genus from a mollusk found on the coasts of North America.

FOEHR or FOEHRDE, a Danish island off the northern coast of the western part of Schleswig, about 25 miles in area and 98 miles in circuit, has 5 parishes and about 5000 inhabitants. It is divided into Osterlandföhr, which forms part of Schleswig, and contains the port of Wyk, 54° 43′ N. lat., and 8° 40′ E. long., 500 feet long, 112 feet broad, and 10 feet deep, which has a bathing establishment; and Westerlandföhr, which forms part of North Jütland. The islanders are engaged in navigation, fishery, and woollen stocking manufactures.

FOELDVA'R. [TOLNA.]

FŒNI'CULUM, the genus to which the common potherb called fennel belongs. It was formerly considered a species of Anethum, but, since the remodelling of the natural order Apiaceæ by Koch, it has been universally looked upon as a distinct genus. Anethum in fact belongs to the subdivision *Peucedaneæ*, with thin flat fruit, while Fœniculum forms part of *Seselineæ*, the fruit of which is tapering or very little compressed, and by no means flat.

In this country we are acquainted with but one sort of fennel, the *Fœniculum vulgare*, a biennial plant with leaves cut into hair-like segments, yellow flowers, and glaucous stems, common on chalky cliffs in the southern parts of England, and everywhere cultivated for the sake of the agreeable aromatic quality of its leaves. There are several others that deserve to be noticed.

Fœniculum dulce, the *Finocchio dolce* of the Italians, is an annual sort which is cultivated in Italy as celery with us; and its blanched stems are said to be an excellent vegetable, resembling celery, but more tender and delicate, with a slight flavour of common fennel. The summers of England are not warm enough to render it possible to cultivate this successfully.

Fœniculum piperitum is a wild fennel, occurring on dry elevated hills in Sicily, where it is called *Finocchio d'asino*: it is known from common fennel by its long slender stem, short rigid leaves, and very hot biting fruit.

Fœniculum Panmorium is cultivated in various parts of Bengal, under the name of *Panmuhuree*, or *Mudhoorika* in Sanscrit. Its fruit has a warmish, very sweet taste, and aromatic smell, and is much used by the natives with their betel and in their curries.

Finally, *Fœniculum capense* is a species little known, with a thick esculent aromatic root, found in the interior of the Cape of Good Hope, but about which little is known.

FŒTUS, a Latin word applied to the immature young of any animals. This term is used in physiology to designate the embryo of mammiferous animals, and particularly of man. There has been considerable confusion in the application of the names fœtus and embryo: the newly-developed germ has been called the embryo during the first six weeks of utero-gestation, or pregnancy, and then during the rest of its uterine life has been denominated the fœtus: but this distinction is entirely arbitrary. The word embryo is applied to the immature being, developed in the ovum of any animal after impregnation, and before it is capable of supporting an independent existence, and therefore is equally applicable to oviparous and viviparous animals: it has a much more extensive signification than fœtus, which is restricted to the embryo of viviparous animals only, in which the ovum after impregnation descends from the ovary into a peculiar cavity denominated the uterus, where it becomes attached to the mother, and derives its nourishment from her till it is sufficiently perfect to exist separately. In oviparous animals, on the contrary, the germ when detached from the ovary is conveyed through a tube called the oviduct, and excluded from the body of the mother, without being again connected with her, or deriving any nourishment from her. The egg requires to be subjected to a certain degree of temperature without the body, for a certain time, before the embryo arrives at a sufficient degree of development to leave the case in which it has been enclosed: during this process, called incubation, the chick is nourished by the absorption of an organized and nutritive substance to which the embryo is connected, and which constitutes the yolk of the egg.

The ovulum of mammalia after impregnation bursts from

the ovary, and is conveyed through the Fallopian tube to the uterus, but it has not been exactly determined how soon it arrives there. Sir E. Home detected an ovum within the uterus, when he supposed that only eight days had elapsed since impregnation; but other accurate investigations have failed in finding any ovum, though it was probable that nearly a month had intervened between impregnation and death.'

The ovum at first contains no embryo visible to the naked eye; in fact it may be considered as now proved by the labours of Wolff and other physiologists, that the organs of the fœtus are successively formed in the ovum, and not evolved, according to antient hypothesis, from parts preexisting in the germ. The ovulum grows rapidly after reaching the uterus; it at first consists of two sacs, one enclosing the other, and the inner containing a liquid. When it is about half a line in diameter, a new element becomes visible in it; a round, opaque, granular disk is seen, with a dark spot in its centre, upon the surface of the internal globule or sac. This spot, which is seen either on or through the inner membrance of the ovum, corresponds with the cicatricula of the egg, and is the first rudiment of the fœtus.

In birds the cicatricula or germ spot lies upon the surface of the yolk: soon after the commencement of incubation it expands and separates into two layers; the outer is called by Pander the serous layer, and subsequently forms the osseous, nervous, muscular, and tegumentary systems of the body; the inner, which is in contact with the yolk, is called the mucous, which (together with a third developed between the two others, and named the vascular layer) appears to give rise, by the changes which it undergoes, to the intestinal, respiratory, vascular, and glandular systems. The mucous layer of the germinal membrane gradually expands over the yolk, till it nearly encloses it in a sac, which towards the body of the chick contracts into an oblong canal, which extends the whole length of the embryo, and becomes the future alimentary tube. The sac containing the yolk, and communicating with the intestines, is called the intestinal vesicle or yolk-bag, and towards the close of incubation is drawn into the belly of the chick, and its contents are used as nourishment. The lower end of the alimentary canal (the cloaca of birds) shoots out into a sac which is termed the allantoïs or allantoïd membrane. After a time arteries and veins are seen ramifying upon this sac, which protrudes more and more out of the body of the chick, till at length it forms a double bag, laid immediately under the membrane of the shell. On this sac the blood-vessels are so distributed that their contents are influenced by the atmosphere through the porous egg-shell and its membrane, and thus a true respiratory organ is established.

The original structure of the ovum, and the early development of the embryo, in mammalia, appear to be much the same as in the egg of a bird; though there are some characteristic differences. When a human ovum of any magnitude is examined, the embryo is seen suspended in a loose bag filled with fluid, called the amnios, which is a shut sac: this sac is the outermost product of the serous layer of the germinal membrane; for its formation a membrane is reflected from the sides and extremities of the embryo, (the reflection, according to Velpeau, not commencing before the twelfth day,) so as to enclose a space behind it. As the walls of the trunk close in front, the circle at which the amnios is attached to the body of the embryo gradually contracts, till at length it is limited to the edge of the umbilical opening; it then invests the umbilical cord, and spreads out from its placental extremity into an ample sac filled with fluid, in which the fœtus floats. The mucous layer of the germinal membrane in mammalia is supposed from analogy to form a sac, as in birds, containing a yolk, or substance subservient to the nourishment of the fœtus in its early stage. Whether this view of its formation and use be correct or not only rests on analogy; but in the early part of gestation a small sac or bladder, which from its being filled with a whitish fluid has been called the vesicula alba, may be found on the placenta, at or near the extremity of the umbilical cord, and exterior to the amnios; from this sac a fine tube may be traced along the cord to the navel, and in some animals it has been seen communicating with the intestinal canal. This tube becomes obliterated so early (Velpeau says in the sixth week of gestation) that its communication with the intestines was long undetected, though the sac was known to the older anatomists. The intestinal vesicle finally differs in mammalia and birds in this circumstance, that in the former it is not drawn into the body of the fœtus, but remains without between the membranes, and gradually wasting becomes obliterated by the third month. The duct of the umbilical vesicle is accompanied along the cord by an artery and vein, which are called the omphalo-mesenteric vessels; the artery communicates with the superior mesenteric, and the vein with the vena portæ. The allantoïs exists in all mammals as well as in birds, though its use in the former, which are furnished with a placenta, is not obvious. In some animals, as in man, it becomes obliterated at a very early period, as soon as the sixth week, but in others, as the carnivora, &c., it attains a large size, and continues during the whole period of fœtal existence. In mammalia it communicates with the fundus of the bladder, and the remains of the duct by which it is connected is denominated the urachus. The channel of communication between the allantoïs and the bladder, or cloaca (in birds), at first is short, so that the sac lies directly against the body of the embryo, but it afterwards becomes elongated, like the corresponding duct of the umbilical vesicle.

In man, after impregnation has taken place, a spongy membrane is formed on the inner surface of the uterus by an exudation of lymph. This membrane, called decidua, lines the whole of the uterus before the descent of the ovum; but when this passes down through the Fallopian tube it gradually pushes the deciduous membrane before it, inverting one portion of it which surrounds the ovum, and is called the, 'decidua reflexa;' this grows with the ovum till it fills the cavity of the uterus, and comes in contact with the other portion called the 'decidua vera,' lining the walls of the uterus.

The point at which the decidua is reflected upon the ovum is where the placenta is fixed to the uterus. The ovum has two proper membranes, the amnios, which we have described, internally, and an outer membrane, which is called the chorion; this latter membrane in man, during the first two months of pregnancy, has a shaggy external surface, being covered with vascular villi, which become united with the membrana decidua, which is also thick and vascular. This thickening and vascularity of both these membranes gradually diminishes, and becomes concentrated on one part, usually towards the fundus of the uterus; this thickened part is called the placenta. In ruminating animals the thickening and vascularity of the chorion is confined to a number of circular and spongy elevations varying in number from thirty to one hundred, which are called cotyledons. These vascular processes dip in between corresponding processes attached to the uterus of the mother, which are called maternal cotyledons, the surface of which is supplied with numerous vessels derived from the uterine arteries and veins. The result of this arrangement is that a large vascular surface of the maternal system is applied to an equally extensive one of the fœtus, and though there is no direct communication between the arteries and veins, we must suppose that nourishment is imbibed from the vessels of the mother by those of the fœtus through the fine intervening membranes by which they are separated. In man the relation between the maternal and fœtal systems is not so clearly understood as in the preceding instance. In the human subject the placenta is a spongy vascular mass like a cake, from six to eight inches in diameter, about an inch thick in the middle, and two or three lines at the circumference. It adheres by one surface to the uterus, and by the other is connected with the fœtus by means of the umbilical cord. The uterine surface is lobulated, and is connected with the uterus by blood-vessels. The fœtal surface is covered by the chorion and amnios, and presents the ramifications of the umbilical vessels, which consist of two arteries and a vein. The radicles of these vessels communicate with each other, but no communication has ever been shown to exist between them and the utero-placentine vessels; for if we inject from the umbilical arteries we find that the placenta is rendered turgid, and that vessels are found filled in every part of it, but between their ramifications there will remain an uninjected substance, and the uterine surface will not be injected, for the fœtal vessels do not pass all the way to that surface. In like manner, if we inject from the uterine vessels, the placenta will be rendered turgid, but nothing passes into the fœtal vessels. From this circumstance it is concluded that the placenta consists uniformly of two portions: the one is furnished by the deciduous coat of the uterus, the other by the vessels of

the chorion, and these two portions may, during the first three months, be separated from each other by maceration. The structure of the fœtal portion, so far as can be made out, appears to be similar to that of the pulmonary vessels, the artery terminating in the vein. But the maternal portion is somewhat different; there is not a direct communication, but the arteries, as Mr. Hunter thought, seem to terminate in irregular cells, and the veins appear to commence with open mouths from these cells, for by throwing wax into the uterine arteries we fill the cells, and frequently inject the uterine veins also.

It has always been considered doubtful whether the placental cells of Hunter were real or artificial, being, in the latter case, produced by extravasation of the injection; and the recent researches of Dr. Robert Lee have confirmed this doubt, but without throwing any satisfactory light on this very obscure subject. With regard to the use of the placenta we may infer that it is very similar in man to what it is in ruminating and other animals; it most probably serves to produce a change in the blood of the fœtus analogous to that which the blood of the adult undergoes in the lungs; and, from considering that the fœtus itself cannot create materials for its own growth and support, we may further infer that the placenta is the source of nutrition also.

The navel-string, or umbilical cord, which connects the child to the mother, is composed of the umbilical vein and two umbilical arteries twisted together, and surrounded by a gelatinous substance and the reflections of the chorion and amnios: it also contains the urachus, and the remains of the duct of the vesicula alba and omphalo-mesenteric vessels. It is visible in the human embryo in the sixth week as a short and straight cord; at birth the length of it is, on an average, about two feet. The outer tunic of the cord, the amnios, is continuous with the epidermis, or cuticle of the fœtus at the umbilicus; and in the same way the chorion, which is also reflected on the naval-string, is continued into the dermis, or true skin of the fœtus.

We have already described the early development of the embryo, and the first changes which take place in the ovum. When the human fœtus is first distinctly visible through the membranes it is not above a line in length, and of an oblong shape. At the end of about six weeks it is slightly curved, and somewhat resembles a split pea; at the conclusion of the second month it may be compared in size and shape to a kidney bean. To the naked eye the embryo at first seems formed by two oval bodies connected together by a slender neck; one of these represents the head, and the other the trunk; the former, which is at first merely a membranous bag, bears a large proportion to the trunk; the features soon appear, and are very perceptible by the end of the second month. The extremities begin to shoot out like the buds of a plant in the sixth week; the arms are at first large in proportion to the legs; in fact, the limbs are originally very much alike, and only distinguishable by their situation; they at first grow straight out from the trunk. The upper arm is then laid against the breast, and the fore arm drawn upward; the thigh is bent up to the belly, the leg drawn backwards towards the thigh, and the feet turned in.

At an early period of fœtal existence there is no brain, but only the spinal marrow, so that the embryo of man then resembles one of the lowest orders of animals; the brain is perceptible about the second month, and is evidently formed by a prolongation of the spinal cord. Before the sixth month the brain is semifluid. Hair does not grow on the head before the sixth month, and even then it is very short, thin, and light coloured. The nails are at that period indistinct, the eye-lids closed, and the pupil is filled up by a membrane. In the seventh month the membrana pupillaris is removed, the eye-lids open, the nails become more distinct, and the hair longer and thicker. At the full time the nails are quite formed, the hair covers the head, and is of its proper colour, the cells of the skin are filled with fat, the lungs are large and red, the valve of the foramen ovale completely formed, the ductus arteriosus nearly an inch in length, and almost as large as the aorta itself.

The proportion between the weight of the embryo and its envelopes is reversed at the beginning and end of gestation. When the fœtus does not weigh more than a scruple, the membranes are nearly as large as an egg, and full of fluid; at the end of gestation the average weight of the fœtus is seven pounds, while the placenta and membranes together do not weigh a pound and a half; the proportion of liquor amnii is also much less. The most general height of a full-grown child is about twenty inches.

The fœtus has many peculiarities which distinguish it from the child after birth, most of which are peculiar to its mode of life, and are lost immediately after being separated from the mother, or are gradually removed during gestation. The most characteristic difference is that it lives in a medium of water, and not of air, and consequently does not breath by lungs, but has the blood which is deteriorated by circulating through the system purified in some manner in passing through the placenta. The umbilical vein carries the blood from the placenta to the fœtus: it enters the liver by the longitudinal fissure, and in the transverse fissure communicates with the vena portæ, sending the greater part of the blood to be circulated in the liver. This organ is of great size, and seems to perform some important office in the fœtal œconomy. It is conjectured by Dr. R. Lee to secrete albuminous matter, which nourishes the fœtus. The rest of the blood is transmitted directly to the vena cava inferior by the ductus venosus, which seems to be a continuation of the umbilical vein in man, though in most animals it is merely a branch arising from the sinus of the vena portæ. The blood conveyed by the vena cava inferior to the right auricle of the heart, does not all pass, as in the adult, into the right ventricle, but a great portion goes immediately into the left auricle through an opening in the septum of the auricles called the foramen ovale, which closes up immediately after birth. The blood that still goes into the right ventricle through the auriculo-ventricular orifice is propelled into the pulmonary artery, but, as there is no use for it at present in the lungs, it nearly all passes through a vessel named the ductus arteriosus into the aorta. This duct also becomes obliterated after birth, its functions having ceased when once the child has breathed.

By the aorta the blood is sent from the left side of the heart and ductus arteriosus to the different parts of the body, from which it is returned by the veins, but a great part of it passes out of the body of the fœtus by the umbilical arteries which are continued from the internal iliacs, and pass out at the navel to go to the placenta. The blood of the fœtus differs in its physical and chemical qualities from that of the adult. There is before birth no distinction between arterial and venous blood; it is of a dark colour in both systems of vessels. The purified blood is brought from the placenta by the umbilical vein, and is mixed before arriving at the heart with that which has been circulating through the fœtus: the mixed blood is then transmitted by the aorta to various parts of the body; some of it only going again to the placenta by the umbilical arteries to be again purified.

The position of the child in the uterus is that which takes up the least room; it lies with the head downwards, the chin being bent on the breast; the knees are doubled up close to the belly, and the arms are folded in the space between the head and legs. This is the most general position, and the child thus forms an oval figure, of which the head forms one end and the breech the other. The long axis of this ellipse measures in the ninth month fully ten inches, and the short one five or six. The quantity of fluid which surrounds the child at the full time is, on an average, about two pints.

The ordinary period of utero-gestation in man is forty weeks, though labour often takes place before this period, or is delayed a little beyond it. The embryo having now arrived at a sufficient degree of maturity to exist separately, the fibres of the uterus contract, accompanied by contraction of the abdominal muscles and diaphragm. In consequence of this pressure the membranes gradually dilate the mouth of the womb; they then burst and evacuate the liquor amnii, when the pressure acts upon the child itself, which is gradually forced into the world and commences a new existence. In man, and other mammalia, the young being for a considerable time depends upon its mother for the whole of its nourishment, and very generally requires a supply of warmth and a degree of protection till it is able to provide for itself.

FŒTUS (in Botany). The fœtus of plants is what botanists term the embryo; a firm, cellular, more or less cylindrical body, either divided into two or more lobes or cotyledons, or having but one cotyledon rolled upon itself, and usually with its margins so united that it appears extremely

like a solid cylinder. The cotyledons are placed upon a small body, which may be compared to two cones with their bases applied to each other, and consequently with their apices pointing in opposite directions, and which separates them in a slight degree when there are two or more cotyledons. That cone which points towards the apex of the cotyledon is the *plumule*, and the other the *radicle*. Of these parts the cotyledons are rudimentary leaves, and the double cone a rudimentary axis of growth, the plumule giving birth to the stem and the radicle to the roots.

The embryo rarely, if ever, exhibits any distinct traces of either vascular or woody tissue until the commencement of germination, but as soon as that phenomenon takes place both are rapidly developed in abundance.

The embryo of a plant is developed in the nucleus of the ovule [OVULE], and always first appears in that part of the nucleus which is next the foramen. It is first seen as a whitish semi-opaque globule; after which it gradually organizes its radicle next the foramen and its cotyledon or cotyledons downwards into the mucilage which, at that time, fills the cavity of the ovule; eventually absorbing all the mucilage, when it occupies the whole interior of the seed, or only a portion of it, in which case it is associated with albumen. When it first appears it does not lie loose in this mucilage or water of development, but it adheres to a cellular cord which is attached by one end to the chalaza, and by the other to the summit of the nucleus where the embryo first appears. This cellular cord usually disappears by the time the embryo is matured, but in many plants, Nymphæa and Cycas for instance, it remains visible in the seed as a long twisted irregular thread, from which the embryo is found to hang when it is taken out of the seed. (Treviranus, *Symbolæ Phytologicæ*, fasc. i.; and Mirbel *sur l'Ovule*, p. 37.)

FO'GGIA, the chief town of the province of Capitanata, in the kingdom of Naples, situated in the midst of a vast and perfectly level plain, which extends from the foot of the Apennines to the Adriatic, is the residence of the intendente and the seat of the criminal court of the province. For civil suits Capitanata is subject to the Gran Corte Civile of Naples. The Royal Lyceum of the province is at Lucera; but there is at Foggia a secondary or grammar-school as well as elementary schools, and also a school of agriculture and rural economy. The Tribunal of Commerce for the provinces of Apulia was established here in 1818. Foggia is a modern-looking, regularly-built town with wide streets, some fine buildings, and 21,000 inhabitants. It carries on a great trade in corn, wool, and cattle, the staple produce of the country, and has large granaries for storing corn. A great fair is held here in the month of May. Foggia is chiefly a place of trade, being the great inland market for the agricultural produce of Apulia, and is also the residence of the provincial nobility and landholders, who are wealthy and hospitable. The climate is not wholesome in the summer months, and the night air especially is considered unhealthy. Foggia is reckoned, for its importance and wealth, the second town in the kingdom of Naples. It stands on the high road from the capital to the eastern provinces, 75 miles north-east of Naples, 25 south-west of Manfredonia, and 77 miles west-by-north of Bari. The neighbourhood of Foggia being planted with olive, mulberry, vine, and other fruit-trees, looks like an oasis in the vast naked and solitary plain of the Tavoliere. [CAPITANATA.] A branch of industry at Foggia is the pickling of capers, which grow in great quantity in the neighbouring country.

FOIL, in Gilding. [GILDING.]

FOIX, the name of a town and former county of France. The town of Foix is the capital of the department of Arriège, and is situated on the left bank of the river which gives name to the department. It is among the Pyrenees, but many miles from the line of the highest elevation, about 404 miles in a straight line south-by-west of Paris. It is in 42° 58′ N. lat., and 1° 36′ E. long.

An antient tradition ascribes the foundation of this place to the Phocæans of Massilia (Marseille), and attributes to it the name of Phocée; but this tradition does not seem to be supported by anything, unless it be the modern name of the town. Foix seems rather to have owed its original to an antient castle, the residence in the middle ages of the counts of Foix, and to an antient abbey, founded by the counts of Carcassonne, and endowed by the counts of Foix with additional possessions. The streets of the town are narrow; but there is a good though antique stone bridge over the Arriège; and the remains of the castle, consisting of three decayed Gothic towers, on a height commanding the town, are interesting from their historical recollections. The population of the town in 1832 was 3225, that of the commune 4857. The inhabitants are industrious, but the secluded situation of the place restricts its commerce: coarse cloth, serge, hats, and hosiery are manufactured; and trade is carried on in cattle, pulse, resin, turpentine, cork, iron, and woollen cloth. There are some coal-pits; and on the banks of the river are several forges. Foix has a subordinate court of justice and several government-offices, an exchange, a high-school, a library, a theatre, and a society of agriculture and the arts. The town has no communication by posting with the capital: the line of post ceases at Toulouse, about 50 miles from Foix; and, although there are in this part fourteen passes or defiles of the Pyrenees communicating with Spain, none of them are practicable for carriages.

The territory known as the county of Foix was formerly part of the territory of the Volcæ Tectosages, and perhaps of the Consoranni inhabitants of the Couserans. It was afterwards part of the territory of the counts of Carcassonne, who were in feudal subjection to the counts of Toulouse: but upon the death of Roger I. count of Carcassonne, who divided his estates between his family, it became, about the beginning of the eleventh century, a separate jurisdiction, which fell to Bernard, second surviving son of Roger. This separate jurisdiction was afterwards erected into the county of Foix. The counts made a conspicuous figure in the civil and religious dissensions of the middle ages: Raymond Roger (A.D. 1188-1223) and Roger Bernard le Grand (A.D. 1223-1241) supported the counts of Toulouse against the Crusaders under Simon de Montfort and the other supporters of the papal authority: the former distinguished himself by various exploits in the course of the crusade against the Albigenses and their protector the count of Toulouse. [ALBIGENSES.] He acknowledged himself the vassal of Peter king of Aragon, whence it arose that the kings of Aragon pretended to the sovereignty of the county, till James of Aragon (A.D. 1258) renounced his claim in favour of St. Louis of France. Gaston IV. count of Foix came into possession (by inheritance from his father-in-law) of the kingdom of Navarre; and the county of Foix, thus united to the other possessions of the royal house of Navarre, fell to the crown of France upon the accession of Henri IV., A.D. 1589.

The county of Foix was small: its greatest extent was from north-by-west to south-by-east about 50 miles; its greatest breadth about 35. It was bounded on the east, north, and north-west by Languedoc, on the west by the district of Couserans, and on the south by the crests of the Pyrenees, by which it was separated from Cerdagne and Roussillon. The territory thus described is watered by the Arriège, which runs through it in the direction of its greatest length. It was subdivided into La Haute Partie (the upper district), La Basse Partie (the lower district), and Le Donnezan. The chief towns were Foix, Pamiers (population in 1832, 5150 for the town, or 6048 for the whole commune), La Bastide de Seron (pop. 1652 for the town, or 2911 for the whole commune), Mazères (pop. 2327 for the town, 3170 for the commune), Saurat (pop. 2563 for the town, 5014 for the commune), Saverdun (pop. 1897 for the town, 3327 for the commune), Ax or Aqs, Tarascon, and Les Cabanes.

The present arrondissement of Foix comprehends eight cantons, and 140 communes: it had, in 1832, 89,892 inhabitants.

FOIX (GASTON III. COUNT DE), Viscount de Béarn, was born in 1331. He was the son of Gaston II. by Eleanor, daughter of Bernard V. Count de Cominges. From his personal beauty, or his fondness for the chase, he was called Phœbus, on which account, agreeably to the fashion of his day, he took the sun for a device. His father died when he was twelve years old, leaving him under the guardianship of his mother. In 1345 he made his first essay in arms against the English in Guienne, and served afterwards in Languedoc, where, and in Gascony, he subsequently became the king's lieutenant. In 1349 he married Agnes, daughter of Philip III. king of Navarre. In 1356, being suspected of holding criminal intelligence with his brother-in-law Charles the Bad, he was arrested by order of King John, and sent to the prison of the Châtelet, at Paris; but, being released soon afterwards, he went

to Prussia to serve against the infidels. In 1358, during the revolt called the Jacquerie, he aided in the rescue of the Dauphin, whom the Parisians had shut up in the market-place of Meaux, and in the same year made war upon his relative the Count d'Armagnac, who had set up pretensions to the viscounty of Béarn, and whom he afterwards took prisoner, in 1372, at the battle of Launac. Gaston, who had become discontented with his wife, upon a dispute about her dower, parted from her in 1373. In 1380, the government of Languedoc becoming vacant by the recall of the duke of Anjou, it was bestowed by Charles V. on the Count de Foix. He held it however but a few months. Charles V. dying on Sept. 16th that year, Charles VI. revoked the appointment, and gave it to the duke of Berri. The Count de Foix appealed to arms, and finally yielded up the government only on negociation. By his marriage the Count de Foix had but one son. This youth, in 1382, paying a visit to his mother, who had retired to the court of her brother, Charles the Bad, received from that king (to whom crime was familiar) what he pretended was a bag of love-powder, which that king told him to conceal, at the same time informing him that the sprinkling of a small quantity of it upon any food his father might eat, would have the effect of reconciling the count to his wife. The powder turned out to be a strong poison, and Gaston ordered his son to be arrested. The young prince, deceived but not guilty, refused all nourishment, and died in his prison; the father, as Froissart relates, having hastened his death when going to remonstrate with him, by accidentally striking the point of a knife into his son's throat as he pushed aside the tapestry which covered the entrance to his dungeon.

In 1390 Gaston received Charles VI. and his whole court at his castle of Mazères, in the diocese of Mirepoix, where he not only entertained them with great magnificence, but made the king the heir to his domains. He died of apoplexy in the beginning of August, 1391, as his attendants were pouring water on his hands at his return from a bear-chase.

Historians, especially Froissart, have painted Gaston as an accomplished, brave, affable, and magnificent prince: they cannot however deny that he was violent to excess. His conduct toward his son, and to De Berne, the governor of the castle of Lourde, whom he wished to force to deliver the place to the French, and whom, on his refusal, he struck several times with his poniard, are incontestable proofs. His favourite passion was hunting. He carried it to such extreme, that if we may believe Saint-Yon, he did not keep fewer than sixteen hundred dogs. He also composed a work on what constituted the object of his affection, entitled *Phebus des deduitz de la Chasse des Bestes sauvaiges et des Oyseaulx de proye*, three or four editions of which are known; viz., fol. Par. by Verard, without date; another by J. Treperel; 4to. by Phil. le Noir, without date, and 1515 and 1520. The book of 'Phebus' is also included in several of the early editions of the Treatise on Hunting by Jacques de Fouilloux. (*L'Art de vérifier les Dates*, fol. Par. 1784, tom. ii. pp. 312, 313; *Biogr. Universelle*, tom. xv. p. 131; Goujet, *Bibliothèque Françoise*, tom. ix. p. 114.) It was in the castle of Orthes, Gaston's principal residence, that Froissart, who staid there a considerable time, heard many of the best stories with which his history is embellished. The portrait which he has drawn of Gaston is one of the completest pictures of what a chivalrous prince was in the time of our Edward the Third.

FOKIAN. [CHINA, p. 80.]

FOKSHAM. [WALLACHIA.]

FOLA'RD, JEAN CHARLES DE, was born at Avignon, in 1669. He entered early into the army, and distinguished himself by the attention which he paid to the scientific part of his profession, to the movements and manœuvres of an army in the field; he drew plans and maps, and became a pretty good engineer. Having been made aide-de-camp to the duke of Vendome, he attended him in his Italian campaigns, and was wounded at the battle of Cassano. He afterwards served in Flanders under the duke of Bourgogne, and was wounded again at the battle of Malplaquet. His zeal, at times indiscreet, his want of tact, his restless activity, and his fondness of giving advice, which, although at times valuable, was not acceptable to his superiors, made him many enemies. The peace of 1712 having placed him on the reduced list, he repaired to Malta to offer his services to the order of St. John, which was then threatened b the Turks; but being offended at some real or supposed slight, he returned to the continent, and visited Sweden, where he was well received by Charles XII., who employed him on some missions, and whom he accompanied in his last expedition to Norway. After Charles's death in the trenches of Fredericshall, Folard returned to France, and made one short campaign more in the war against Spain of 1719, after which he withdrew into private life, and occupied himself in writing on military matters. He died at Avignon in 1752.

Folard's principal work is his 'Commentaries on Polybius,' in which he not only makes his observations on the events narrated by the Greek historian, but also draws parallels between antient and modern military practices, and reasons on the occurrences of the wars which he had witnessed, exposing with the greatest freedom the errors of the various commanders of his own age. His disquisitions, though often prolix, are valuable. He had some peculiar notions on tactics, which have been refuted as inapplicable to the modern system of warfare. Frederic II., a very good judge of these matters, says that 'Folard had scattered diamonds amongst dung, that his system of columns in deep order was worthless, but that the movements which he describes so well, and certain instances of ingenious defence which he explains, may be useful, as well as his strictures on the conduct of some French generals, and also certain projects of his which give rise to reflections more useful than the projects themselves.' Folard's 'Commentaries' were published in 6 vols. 4to., Paris, 1727-30, and again at Amsterdam, in 7 vols. 4to., the seventh volume containing some treatises and strictures on Folard's system of tactics, with his own replies.

FOLCLAND. [BOCLAND.]

FO'LIO, from the Latin *folium*, properly signifies a leaf; and in books of accounts means a leaf, or two pages, of a ledger-book. Folio *a* and *b*, or *recto* and *verso*, are antient and still continued distinctions for the first and second sides of the leaf or folio, in manuscripts and early printed books. Folio, with booksellers, means a book in folio, the pages of which consist of sheets folded only in two, each leaf making half a sheet. 'Folia chartarum' is an expression at least as old as the time of Pliny.

FOLKES, MARTIN, an eminent English antiquary, was the eldest son of Martin Folkes, Esq., and was born in Great Queen Street, Lincoln's-Inn-Fields, October 29th, 1690. He entered of Clare Hall, Cambridge, in 1707, where his progress in all branches of learning, and more especially in mathematics and philosophy, was such, that when he was scarcely more than twenty-three years of age he was admitted a fellow of the Royal Society, and two years after had so distinguished himself as to be chosen one of its council. His first communication to the Society was on the aurora borealis of March 30, 1717. This was followed at various times by other papers in considerable numbers, for which it may be sufficient to refer to the 'Philosophical Transactions.' He was chosen a second time of the council of the Royal Society in 1718, and continued to be re-chosen every year till 1727; Sir Isaac Newton, the president, having in 1723 appointed him one of his vice-presidents. In February, 1720, he was elected a fellow of the Society of Antiquaries.

At the first anniversary election of the Royal Society after the death of Sir Isaac Newton, in 1727, Mr. Folkes was competitor with Sir Hans Sloane for the office of president, and his interest was supported by a great number of members, though the choice was determined in favour of Sir Hans. He was, however, again chosen of the council in 1729, and continued in it till he was advanced to the president's chair twelve years after. In the mean time he was, in 1733, appointed one of the vice-presidents by Sir Hans Sloane. In this year he set out with his whole family on a tour to Italy, and, after residing a considerable time both at Rome and Florence, returned to England in September, 1735. The opportunities which he had of consulting the best-furnished cabinets of Italy enabled him to compose there an excellent 'Dissertation on the Weights and Values of antient Coins.' This was read in the Society of Antiquaries, who requested that a copy of it might be registered in their books, which he promised to give after he had revised and enlarged it; but, for some reason, this was never done. In the same year however, 1736, his 'Observations on the Trajan and Antonine Pillars at Rome' were read in this Society, and afterwards printed in the first volume of their 'Archæologia,' which contains another paper

by him on the brass equestrian statue of Marcus Aurelius at Rome, occasioned by a small brass model of it being found near London. In April he also communicated to them 'A Table of English Gold Coins from the 18th year of King Edward III., when Gold was first coined in England, to the present time, with their Weights and intrinsic Values;' which at their desire he printed the same year in 4to.; and in 1745 reprinted it with additions, prefixing a larger and more considerable work, entitled 'A Table of English Silver Coins, from the Norman Conquest to the present time, with their Weights, intrinsic Values, and some Remarks upon the several Pieces.' Mr. Folkes, in order to illustrate this work, had set about engraving, and actually did engrave 42 copper-plates of English silver coins, which were left at the time of his death in an incomplete state. These, together with the copyright of the books or tables before mentioned, were purchased by the Society of Antiquaries, December 19th, 1754, for 120*l.*, and the whole published, with great additions, both as to letter-press and plates, under the care of Dr. Andrew Gifford, in 1763.

Sir Hans Sloane having, on account of his advanced age, resigned the office of president of the Royal Society, at the annual election in 1741, Mr. Folkes was unanimously chosen to fill that honourable post; and, in the following year, was chosen to succeed Dr. Halley, as a member of the Royal Academy of Sciences at Paris. In 1746 the University of Oxford conferred upon him the degree of LL.D., and he was afterwards admitted to the same degree at Cambridge.

On the death of Algernon, duke of Somerset, president of the Society of Antiquaries, in February, 1750, Mr. Folkes, then one of the vice-presidents, was immediately chosen to succeed his grace in that office, in which he was continued by the charter of incorporation of that Society, November 2, 1751. But he was soon disabled from presiding in person, either in that or the Royal Society, being seized on September 26th of the same year with a palsy, which deprived him of the use of his left side. In this unhappy situation he languished nearly three years, till a second stroke put an end to his life, June 28th, 1754. He was buried near his father and mother, at Hillington, near Lynn in Norfolk, under a black marble slab, with no inscription but his name and the date, pursuant to the express direction of his last will. By his wife, Lucretia Bradshaw, who had been an actress on the stage before he married her, he left two daughters. The sale of his library, prints, coins, &c., in 1756, lasted 56 days, and produced the sum of 3090*l.* 5*s.* A monument to his memory was erected in Westminster Abbey in 1792, in a window on the south side of the choir, opposite to the monument of Mr. Thynne. (Nichols's *Anecdotes of Bouyer*, 4to., London, 1782, pp. 562—566, from a memoir prepared for publication by Dr. Birch; Chalmers's *Biogr. Dict.*, vol. xiv. pp. 428—431.)

FOLKESTONE. [KENT.]

FOLK-MOTE, or FOLK-GEMOTE, literally a meeting of the people; an assembly under the Anglo-Saxon government, respecting the nature of which some of our antiquaries have differed. Somner, in his 'Anglo-Saxon Dictionary,' calls it a general assembly of the people for considering and ordering matters of the Commonwealth. So the laws of King Edward the Confessor, 'Folcmote, *i.e.* vocatio et congregatio populorum et gentium omnium, quia ibi omnes convenire debent, et universi qui sub protectione et pace Domini Regis degunt.' The continuation of this statute of Edward the Confessor expressly directs that the meeting of the Folcmote should be held once in the year upon the 1st of May. 'Statutum est enim quod ibi debent populi omnes, &c., semel in anno scilicet convenire, scilicet in capite Kal. Maii.' (Wilk., *Leg. Anglo-Sax.*, p. 204.)

Brady, in his 'Introduction to Old English History,' Gloss. p. 47, is entirely mistaken when he speaks of it as an inferior ordinary court, held once a month. The Folk-mote and Shire-mote (or general meeting of a county) were synonymous. (Wilk. *ut supr. Gloss.* p. 404.)

In later times a Folk-mote, according to Stow, among the citizens of London, meant a meeting of themselves. Fabyan, in his 'Chronicles' (edit. 1811, p. 344), mentions a court of folk-mote held at Paul's Cross in 1256; and another assembled by command of Henry III. (ibid. p. 345), 'where the king, according to the former ordinances made, axed licence of the commonalty of the city to pass the sea.'

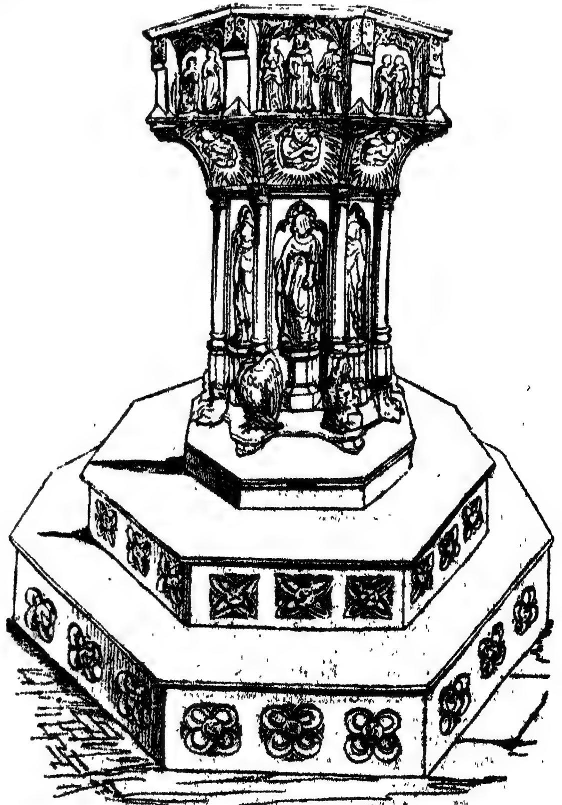
FOMALHAUT. [PISCIS AUSTRALIS.]

FOMENTATIONS are liquid applications, generally of a warm temperature, placed in contact with a limited portion of the body, to mitigate or remove disease of the part, or of the neighbouring organs. They differ from partial or local baths, chiefly in the greater length of time which they are kept applied. Flannel cloths, or other substances fit to retain heat and moisture, are commonly employed. To enable these substances to retain the heat still longer, they are often covered externally with oiled silk. It is proper to renew the application before the cloths begin to give a feeling of coldness. The liquids used are of various kinds, sometimes pure water; at other times, medicated; they are termed emollient when charged with mucilaginous principles, such as mallows, and sedative or anodyne when they contain a narcotic principle, such as poppy heads.

FONDI. [LAVORO, TERRA DI.]

FONT, a vessel employed in Protestant churches to hold water for the purpose of baptism, and in Catholic churches used also for holy water. The form of the font is usually hexagonal, similar to the form of the baptistery, in which fonts were originally placed. There are a great many fonts in England curious both for their antiquity and their architectural design: they date from the Saxon period to the time when the florid style of Gothic architecture was in vogue, in the reign of Henry VII.

Although the hexagonal form is the most usual, yet fonts occur both of a circular and square form. They are usually shaped like a cup, with a solid stem, or supported on columns; the top is hollowed out for the water, and the sides and stem are often highly enriched with ornament, sculptured figures, and with colour and gilding. In many instances a flight of steps forms a base, and even the sides of these steps are carved with pannels, having quatrefoils and rosettes sunk within them. It was usual to cover the basin of the font with a wooden lid, and there are some of these remaining of a pyramidal or spire-like form, richly carved and designed, with a profusion of shafts, buttresses, and tracery piled up to the apex. There is such a cover in Castleacre church, Norfolk. Porchester church has a very antient font, of a circular form, like the antient Roman puteal or circular stone-mouth of the well in the atrium of a Roman house; it is decorated with intersecting arches on columns, with a frieze of foliage, and figures above. Lincoln cathedral, and the South Church in Hayling Island, Hampshire, are examples of the square form of font on five



Font in East Dereham Church, Norfolk, from an original drawing made by Mr. W. B. Clarke, architect, in 1834.

columns; one being placed in the centre, of much larger dimensions than the four columns which are at the angles. The font of Blythborough church in Suffolk still shows some traces of colouring and gilding; and that of Lowestoff church in Norfolk has some fine remains of sculptured figures representing kings and queens. The font at Loddor in Norfolk is remarkable for its elegance and richness of decoration. In Winchester cathedral there is one of the most antient and curious fonts in the kingdom. In the elaborately designed porch of East Dereham church, Norfolk, are two fonts, or stoups, as they are usually designated, originally intended for holy water.

The Gothic fonts in England exhibit every species of design and decoration belonging to the several periods or styles of Gothic architecture, and therefore merit the attention of the antiquarian and architect. There are numerous drawings of fonts in 'A Series of Antient Baptismal Fonts, chronologically arranged,' &c., published by Mr. Weale, High Holborn, London.

FONTAINEBLEAU, a town in France, the capital of an arrondissement in the department of Seine et Marne. It is on the high road from Paris to Montargis, Nevers, Moulins, and Lyon; 33 miles from Paris in a straight line, or 35 by the road. It is in 48° 24′ N. lat., and 2° 42′ E. long. There has been much dispute respecting the etymology of the name, but the most probable opinion is that which derives it from the name of a fountain, called, in antient title-deeds, Fons Bliaudi or Blaudi, and said to have obtained that name from Bliaud, one of the hounds of Louis VII. le Jeune, or more probably from the name of the original owner of the spot. There is no mention made of Fontainebleau until the time of Louis VII., who built here (A.D. 1169) a chapel, which was consecrated by the celebrated Thomas-à Becket, in the midst of the surrounding forest, then called the Forest of Bièvre: a château, or royal residence, was in existence at that time, but by whom built is uncertain. The spot was a favourite one both with Philippe II. (Auguste) and with Louis IX. (St. Louis), who founded here an hospital and two chapels. Francois I. caused a magnificent château to be erected here by the architect and painter Primatice: and this structure has been further embellished by the taste or extravagance of succeeding princes. The kings, Philippe IV. le Bel, Henri III., and Louis XIII. were born here, and the first of the three died here. Christina, queen of Sweden, after her abdication, resided here, and has imparted to the place a sad celebrity by the death of her secretary, Monaldeschi, whom she ordered to be executed in a gallery of the château. Here the unhappy Pope Pius VII. lived for eighteen months during the reign of Napoléon, and here Napoléon himself signed his act of abdication of the throne of France in 1814, previous to his retirement to Elba.

The town is situated in the midst of the forest of Fontainebleau: it is well built, especially in the more modern parts: several of the streets are straight, and of tolerable breadth; the houses are of brick and stone united in the same building. The château is an irregular pile, resembling a group of distinct edifices rather than one united building. It has six court-yards, each nearly or quite surrounded with three or four buildings, and combined without any uniform plan. It is adorned with numerous statues and paintings: the works of the Italian artists, Primatice and others, whom Francois I. engaged for the decoration of his residence, have almost entirely disappeared, some from the ravages of time, and others from the rise of a more correct taste, with which their indelicacy was incompatible. The library of Fontainebleau is more numerous than any of those at the other royal residences, but the apartment which is appropriated to it is not sufficient to contain it. The park and gardens are in a style of magnificence corresponding to that of the château: they are adorned with a canal and cascade (nearly three quarters of a mile long, and above 120 feet wide), several smaller canals, and a variety of jets d'eau and statues in bronze and marble: there are some fine avenues in the park. There are two hospitals in the town, one founded in 1646 by Anne of Austria, for fourteen sick paupers, and the other in 1696, by Madame de Montespan, for the education of sixty poor girls, and the maintenance of forty old people: these hospitals have very inadequate endowments, and owe their existence now chiefly to public support. There are also fine barracks.

The population of Fontainebleau in 1832 was 8104 for the town, or 8122 for the whole commune there is very little trade; what there is is chiefly in the agricultural produce of the neighbourhood. Some porcelain, and other earthenware, leather, and calicoes, are manufactured. There are three fairs in the year for cattle, wine, &c.

The Forest of Fontainebleau occupies an extent of nearly 33,000 arpents, above 41,000 acres, or 64 square miles: it surrounds on nearly every side the plain in which the town stands: its surface is unequal, and its soil sandy, interspersed with rude blocks of sandstone, which are quarried for the pavement of Paris. The age of some of the trees, and the width of the avenues which pierce the forest in various directions, impart to it a considerable degree of picturesque beauty: the hermitage of Franchard, about two or three miles north-east of Fontainebleau, is one of its most remarkable sites. The Forest of Fontainebleau furnishes Paris with a small proportion of its fuel, but with a considerable portion of its pavement. There is a good quantity of game; wild boars are numerous.

The gardens of the town and the neighbourhood produce a grape which is known at Paris by the name of *Chasselas de Fontainebleau*. The arrondissement of Fontainebleau comprehends seven cantons, and 104 communes; it had in 1832 a population of 69,953.

FONTAINE, JEAN DE LA, was born in 1621 at Château-Thierry, where his father was Maître des Eaux et des Forêts. No great attention was paid to his education, and he did not display the glimmering of any sort of talent till he had attained the age of twenty-two. His genius is said to have been first called forth on his hearing read an ode by Malherbe, when he is reported to have exclaimed, 'I also am a poet!' At first he took Malherbe for his model, but afterwards turned his attention to the works of Rabelais, Voiture, and Clement Marot. His father, delighted with his imitations of his favourite authors, thought him a prodigy of poetic genius, and a relation advised him to study the classics. A translation of Terence's 'Eunuch,' published by La Fontaine in 1654, was the fruit of this advice. He was much delighted with the Italian authors, especially Machiavelli, whom he chiefly admired for his little novels. On the death of his father, he succeeded to his office, which he filled inefficiently, and took a wife, with whom he lived unhappily, and from whom he finally separated. In fact, he was of too indolent and improvident a disposition for any of the common avocations of life; he does not seem to have had any absolute vice, but to have gone on in his own lounging way without taking any interest in what was passing around him. In an epitaph on himself he describes his life as having been occupied with sleeping and doing nothing; in the latter category he evidently includes the writing of his poems, which he probably threw off when in a happy vein without giving himself any great exertion. Some verses of La Fontaine happening to fall in the way of the exiled duchess de Bouillon, who was residing at Château-Thierry, she caused the author to be introduced to her, and took him with her to Paris when she returned. Here the superintendent Fouquet became his Mæcenas, and placed his name on a list of pensions which he allowed to various persons of merit. On the exile of this minister La Fontaine wrote a pathetic elegy. Though many distinguished persons honoured him with their patronage, his ignorance of the world and his habitual carelessness would have plunged him into difficulties had not a liberal lady, Madame Sablière, taken him into her house, where he resided for twenty years in perfect tranquillity. A well-known story gives a good idea of La Fontaine's quiet lazy disposition. Madame Sablière having had occasion to part with her servants, said to a friend, 'I have now got rid of all my animals but three—my dog, my cat, and La Fontaine.'

In 1684 he was received into the Académie as successor to Colbert, not without opposition from the graver sort, on account of the licentiousness of some of his works. However he triumphed over Boileau, who was the rival candidate. The king, indignant at this, delayed giving assent to his admission, but on the death of M. Bezons, and the election of Boileau to fill his place, the king expressed his approbation of the choice of La Fontaine. On the death of his benefactress, La Fontaine was again reduced to difficulties, and would have been forced to accept an offer of St. Evremond to take him to England, had not the duke of Burgundy assisted him. In 1692, when he became seriously ill, the Abbé Pougit paid him a visit to attend to his spiritual welfare. La Fontaine submitted to the dictates of

the abbé, though he was somewhat restive on two points. In the first place, the abbé demanded a public apology for his licentious tales; in the second, a solemn promise not to give to the actors a comedy which he had written. He made the required apology, but he applied to the Sorbonne before he yielded to the second demand; however, receiving an unfavourable answer, he committed the comedy to the flames. This demand on a poor man to relinquish his only chance of accumulating a small sum, by an act which in itself involved no moral wrong, but merely happened to be at variance with the prejudices of the clergy, is a striking instance of the bigotry of the times. In 1693 La Fontaine became worse, and was even reported dead; but he recovered, and devoted himself to a translation of the hymns of the church and other religious works. He would now have been almost alone in the world, if a friend, M. d'Hervart, had not kindly offered him an asylum in his own house. He died in 1695.

The works by which La Fontaine is known are his Tales and his Fables. The former have a very equivocal set of readers, and are seldom mentioned in society; the latter belong to that small class of works the reputation of which never fades, and which are just as well known at present as they were in the seventeenth century. Innumerable are the editions of these fables, and great is the field they have offered for the ingenuity of artists in furnishing illustrations. To say nothing of the various unornamented editions, they appear in every variety of shape, from an 18mo with vignettes to a huge folio with large and elaborate plates; and even now an edition is publishing adorned with fine wood-cuts, representing all the animals mentioned in the fables in human dresses. It is remarkable that La Fontaine never (or rarely) invented his subjects: his tales are taken from Boccaccio, Machiavelli, Ariosto, and others; his fables are chiefly selected from Æsop. It is not the matter of his compositions, but the manner in which he tells a tale, that constitutes his merit. His narrative is marked by that ease and grace which, as La Harpe says, 'are to be perceived, not described; for if after a profound philosophical investigation,' he continues, 'we arrived at the ultimate causes of excellence, and referred the point to La Fontaine himself, the "bon homme" (as he is called) would say, "I know nothing about this; I wrote them as my humour dictated, and that was all."'

Curiosity will cause a reader to wade through a new story even when indifferently written: but a man who, by his mere manner of narrating, can make a vast number of readers peruse a series of narratives, with every incident of which they are perfectly acquainted—must have talents great indeed.

FONTAINE-L'EVEQUE. [HAINAULT.]

FONTA'NA, DOMENI'CO, a distinguished Italian architect, younger brother of Giovanni, who followed the same art, was born at Mili, on the borders of the lake of Como, in 1543. Having a decided taste for mathematical studies, at the age of twenty he went to join his brother at Rome, nor was it long before he attracted the notice and obtained the favour of Cardinal Montalto, who confided to him the erection of the Cappella del Presepio or Sistina in Santa Maria Maggiore, a work that stamped his reputation as a design of great nobleness and grandeur, although, according to modern taste, it is too overcharged in its ornaments, and too much cut up by the injudicious arrangement of the gilding and coloured marbles. By the same ecclesiastic he was employed to build for him, in the vicinity of the above-mentioned church, the palace now known by the name of the Villa Negroni. This edifice which, partly on account of its gardens, was for a long while one of the most celebrated mansions in Rome, is, like most of the architect's other designs of the same class, exceedingly simple in its composition, and has little decoration beyond what it derives from the dressings and pediments of the windows, which latter are alternately angular and curved. Yet favourable as these undertakings were in themselves, they were not productive of much immediate profit to the architect, and were even injurious to his patron, as they afforded the pope (Gregory XIII.) a pretext for suppressing the pensions of the cardinal, since he was wealthy enough to indulge in such magnificence. On this, out of his attachment to the cardinal and his eagerness to complete the Cappella del Presepio, Fontana generously contributed a thousand scudi of his own, rather than see the scheme abandoned. To his disinterestedness on this occasion he was, in all probability, not a little indebted for his subsequent good fortune, as the cardinal was shortly afterwards elected to the pontifical throne, under the well-known name of Sisto Quinto. The new pope had now the means of indulging his taste for architecture and embellishment; and one of his projects was to re-erect the various Egyptian obelisks which lay scattered and neglected among the ruined fabrics of the antient city. The first to which the pope directed his attention was that which still remained standing in the Vatican circus. This he was anxious to have removed to the area in front of St. Peter's; but the practicability of transporting such an enormous mass (83 feet 2 inches high), and elevating it upon a pedestal, was long doubtful, although the ablest mathematicians and engineers were summoned to suggest the means. Upwards of five hundred different projects and models were submitted to him, nor did Fontana fail to come forward among the competitors, for he produced the model of a machine that acted upon a leaden figure of the obelisk; besides which he gave satisfactory proof of his contrivance by applying it to a small obelisk in the Mausoleum of Augustus. Still, although his plan was approved and adopted, it was not until after urgent representations on his part that the carrying it into execution was intrusted to Fontana, it having been in the first instance determined that Giacomo della Porta and Ammanati should take charge of the operations. A circumstantial account of all the proceedings attending this very arduous enterprise was published by the architect himself, under the title of *Del modo tenuto nel trasportare l'Obelisco Vaticano*. The operations commenced April 30th, 1586, and the obelisk was removed, and placed on the new pedestal prepared for it, on the 13th of the following June, when was successfully accomplished the most stupendous trial of mechanical skill that age had then witnessed, although afterwards rivalled on more than one occasion, and in our own times by the erection of the Alexander column at St. Petersburg, a monolithic granite shaft of eighty-four feet in height and twelve and a half in diameter, which had been previously transported from the quarries in Finland. The complete success of this task gained the architect not only honours and distinction, but a pension of two thousand scudi, and also gave him assurance of an equally favourable result in all similar undertakings. To these belong the three obelisks he afterwards erected in the Piazza del Popolo, before St. Giovanni Laterano, and in front of Santa Maria Maggiore. The second of these is still larger than the first-mentioned, being 105 feet 7 inches high, independently of the pedestal, and its weight calculated at about 440 tons. (*Egyptian Antiquities*; *Lib. Ent. Knowledge*, vol. i., chap. 15.)

In addition to tasks of this nature Sixtus afforded him the opportunity of displaying his talents as an architect, giving him charge of the various works at the Lateran church, to which he attached, on one of its sides, a kind of portico consisting of an upper and lower gallery, in five open arcades, the piers of the former ornamented with a Doric and those of the other with a Corinthian order. Immediately adjoining this portico he also erected the palace of the Lateran, a uniform square pile of building, with two series of windows above the lower floor, all of which have pediments alternately angular and curved, and the whole is surmounted by a massive and rich cornice. By the same pontiff he was likewise charged to construct the Vatican library, and thus destroy the noble court formed by Bramante. [BRAMANTE.] Nor was this the only addition he made to that pile, for he also erected the lofty mass of building on the side towards the piazza of St. Peter's, which, impressive as it is in itself, does not bespeak much fertility of invention, it being little more than a repetition of his palace of the Lateran. Another papal residence, which was partly erected by him, was that of the Quirinal, or Monte Cavallo, so called from the two colossal figures before it, which he removed thither from the Baths of Constantine. Among his other works may be mentioned the restoration of the columns of Trajan and Antoninus, and the fountain of Termini. He was preparing to erect a vast edifice for a cloth manufactory within the Coliseum, the plan of which was to have been elliptical, like that of the amphitheatre, when Sixtus, with whom the idea originated, died, and thus was frustrated a scheme that would irreparably have injured the sublime and majestic character of that monument of antiquity.

The death of that pope brought a change of circumstances to Fontana, who was dismissed by Clement VIII.

from his situation as papal architect. Still his prosperous fortune did not desert him, for he was immediately invited to Naples, by the viceroy, the Count de Miranda. In that capital, to which he repaired in 1592, he was employed on a variety of works; and among others he executed the fountain Medina; but the most important of them all was the royal palace, a grand and imposing, although not particularly elegant edifice. He died in that city in 1607, possessed of considerable wealth, and of a distinguished reputation.

FONTARABIA, or FUENTE RABIA. [GUIPUZCOA.]

FONTENAY, a town in France, capital of an arrondissement in the department of Vendée, and on the left or north-west bank of the river Vendée, which unites with the Sêvre of Niort: it is 281 miles south-west of Paris by the road through Orléans, Blois, Tours, Poitiers, and Niort.

The town owes its origin to a castle which the counts of Poitiers caused to be built here, and of which there are some remains. Fontenay was twice besieged by the Huguenots in the religious troubles of the 16th century (A.D. 1568 and 1570). In the first siege, which was successful, the conquerors, in violation of the terms of the surrender, put the garrison to the sword, and afterwards slew the commandant, whom they had taken to Rochelle. In 1574 Fontenay was the scene of still greater atrocities perpetrated by the Catholics.

The town stands partly in a valley on the bank of the river, partly on a hill. The streets are narrow, crooked, and ill paved. The spire of the church of Notre Dame is remarkable for the lightness of its architecture and its extraordinary height, which is above 300 feet. The covered market-places are of unusual size for a small provincial town. The population in 1832 was 6388 for the town, or 7504 for the whole commune. The chief manufactures are linen and coarse woollen cloths for the consumption of the country; there are several tan-yards and some breweries; trade is carried on in corn, cattle, horses, mules, wood, charcoal, and wine, of which last the neighbourhood produces some white of ordinary quality. There are four yearly fairs and a large corn market. Mill-stones of coarse texture are quarried in the neighbourhood. There are a subordinate court of justice, a high-school, and an agricultural society. The navigation of the river Vendée commences here. Fontenay is sometimes distinguished by the epithet 'Le Comte,' from the antient counts of Poitiers: during the Revolution, when such anxiety prevailed to obliterate all names that could recall the feudal or monarchical period, the designation was changed for that of 'Le Peuple.'

The arrondissement of Fontenay comprehends 9 cantons and 124 communes, and had in 1832 a population of 119,664.

FONTENELLE, BERNARD LE BOVIER DE, born at Rouen 11th February, 1657, was, by his mother's side, nephew of the great Corneille, and, by a long life of nearly a century, contemporary with most of the greatest writers of France, among whom he held a conspicuous station, distinguished as well by the variety of his acquirements as the brilliancy and versatility of his powers. Educated at the College of the Jesuits in his native city, he displayed, at a very early period, the quickness and aptitude of his talents, which he cultivated with the greatest diligence and application. At the age of thirteen Fontenelle successfully contended for the prize offered for the best composition in Latin verse; and in general literature had deserved honourable mention on the records of his college. From this time to his sixteenth year the law was the study to which his attention was nominally directed. But his heart was not with the science: poetry, philosophy, and history engrossed the time which should have been devoted to the Corpus Juris. During this period principally Fontenelle acquired those vast stores of varied and accurate knowledge which, giving an appearance of catholic learning to his works, are constantly recurring in the shape of apposite and almost unconscious allusions. Having completed the term of his legal studies, he lost the first cause in which he was retained, and thereupon abandoning for ever the distasteful profession of the law, devoted himself to the more attractive and congenial pursuits of literature.

In his private fortunes there is little to interest the curiosity so commonly felt respecting the doings of men of genius; the biographer has consequently little to do but to follow him in his literary career, which was neither without honour nor profit. For the last years of his life he was in the enjoyment of a yearly income of nearly 900*l.*, and left behind him at his death a very considerable sum. From 1699 to 1741 he held the distinguished and responsible office of secretary to the Academy of Sciences at Paris, and was an honorary member of that of Berlin and of the Royal Society of London. Fontenelle died at Paris on the 9th January, 1757, having completed his hundredth year within a few weeks, and expired exclaiming 'Je ne souffrée pas, mes amis; mais je sens une certaine difficulté d'être.' The calmness with which he met his death was in keeping with the serenity of his whole life.

In his personal character Fontenelle presents a rare instance of self-command and moderation, neither confounding virtue with austerity nor pleasure with excess. To the measured reserve of his character there is a somewhat exaggerated allusion in his oft-repeated declaration, that in his whole life he had never laughed nor wept. As he held it to be the duty of the sage to cultivate all his senses, internal as well as external, and to combine with the enjoyment of all nature the exercise of all his faculties, the tone of his mind exhibited a happy harmony with his personal character. The universality of his pursuits, which embraced nearly the whole domain of literature, offered on the one hand an insuperable obstacle to unrivalled excellence in any single department, but contributed on the other, by enlarging his views and increasing his stores of knowledge, to render respectable his attainments in all.

As a poet, in which character he made his first appearance in the world of letters, he composed several tragedies and operas, most of which were unfavourably received; and if the 'Thetis and Pelée' met with some success and the praises of Voltaire, it has since fallen with the rest into neglect and oblivion. His Pastorals, which were recommended solely by their novelty, are full of extravagant conceits: on the other hand, there is much of nature and grace in the 'Ismène,' which, with the 'Apologie de l'Amour,' is alone worthy of being preserved. His poetic pieces occasionally display much delicacy of sentiment, and extreme polish and elegance both in the thought and diction; but in all of them the poetic feeling is weak, and there is little invention, and a decided want of originality and force.

The 'Dialogue des Morts,' published in 1683, first laid the foundation of his literary fame, which was firmly established by the appearance two years afterwards of the 'Entretiens sur la Pluralité des Mondes,' one of the ablest of his works, and exhibiting a rare combination of science and wit. The object of the latter was to familiarize his countrymen with the Cartesian astronomy; and in the preface he compares himself to Cicero presenting the philosophy of Greece in a form and language intelligible to the Romans. For the execution of such a task Fontenelle was eminently qualified, and rarely, if ever, has it been so ably accomplished. By the happiness and point of his illustrations, he interests while he instructs his reader: quick to discover in common things unimagined beauties, he adduces and presents new truths in so obvious a light, that even when most opposed to received opinion, they are at once adopted as old and firmly established. In the 'Eloges,' which, as secretary of the Academy, he pronounced upon its deceased members, and by which he is best known to posterity, his peculiar talents are most felicitously displayed. Of a mixed character, between memoirs and criticism, they combine history and encomium with such tact and delicacy, that the panegyric is almost imperceptible, and the commendation the highest when apparently least intended.

The 'Histoire des Oracles,' even if it has no claims to originality, being taken entirely from the learned work of Van Daale, is deservedly celebrated for clearness and precision in the style, which is an exact and distinct image of the thought, and for the regular march of the reasoning, which is so natural and so easy as to present no difficulty to the understanding, and to need no divining. It scarcely deserves however the high title of history. It comprises two essays, in one of which the object is to show that the oracles were not given by the supernatural agency of demons, the other, that they did not cease with the appearance of Christ. Lastly, the 'Géométrie de l'Infini,' the 'Apologie des Tourbillons,' and similar works, although they display a philosophical spirit, are neither vigorous nor profound.

Generally indeed we ought not perhaps to look to the works of Fontenelle to discover the secret of the great influence and reputation which he enjoyed in his lifetime. The solution lies rather in his possession of unequalled social qualities, and of the most brilliant acquirements, by which

he was able to enact at once the man of fashion and the man of letters. By his wonderful skill in adapting himself to the capacity of others, he was able to improve and embellish the lightest conversation with scientific and moral allusions; and by applying the language of ordinary life to the most abstruse topics and ideas, he contributed greatly to transfer the tribunal of letters from the scholarly few to a large and miscellaneous class of readers, and, by this revolution, to favour and to advance a spirit of scientific research in the seventeenth century. Such services may be forgotten, for the names of those who have laboured not so much to discover new truth, as to preserve and transmit the old, are too often left unrecorded; but they have not laboured in vain, for to diffuse truth is as useful as to discover it. If the mission of the discoverer be more dazzling in its course, and its track more permanent, that of the disseminator is not less beneficial to mankind, and leaves, in a more extended civilization, a nameless but imperishable monument.

The works of Fontenelle were collected and published in 8 vols. 8vo., Paris, 1760.

FONTENOY. [HAINAULT.]

FOOD. All organized bodies are nourished by the introduction into their internal structures of materials from without. Such materials are called indifferently aliments or food, and are fitted to supply and maintain the fluid and solid matter of the body. For this purpose they must either be soluble naturally, or capable of being dissolved by the digestive principle of the stomach. However diversified the articles employed may be in external appearance or chemical composition, they are reduced by the action of the organs of digestion into a fluid (chyle) [DIGESTION] of homogeneous character, which is reconverted into solids and fluids of different natures by the influence of the powers of assimilation. Before undergoing this second change, they must be brought into the state of arterial blood, and so form a part of the circulating fluids of the body. Substances which are incapable of undergoing these successive changes cannot be considered as articles of food, or capable of imparting nourishment to the frame. There are however various articles which, although incapable by themselves of nourishing, appear, when taken in conjunction with other articles, to contribute essentially to nutrition. But even of a substance unquestionably nutritious, the whole mass is never completely nutritive, *i.e.* capable of being entirely assimilated; some portion of it merely giving it bulk, or being of a nature calculated to make certain impressions on the organs of digestion, and to stimulate them to those actions which conduce to the exercise of the function of digestion.

Those substances which have previously been endowed with life can alone be considered as affording nutriment to animals of a high degree of organization, such as man, of whose aliment we here mean to treat. For a practical view of the subject, it may be divided into two heads, viz. the substantials and the accessories; the first comprising the real materials or sources of nourishment; the second condiments, &c., which either render the food more grateful to the palate, or by a vital or chemical action on the organs of taste and the stomach promote its digestion.

It is customary to distinguish the articles of food into solid and fluid, or meats and drinks, and into animal and vegetable. But the former is merely a distinction of convenience, and does not extend to any ultimate difference in the nature of the material, but only to the manner in which they are respectively treated by the organs of digestion; while the latter is only important in a medical point of view, as relates to the amount of nutriment in a given quantity of food, and the impression which the two kinds of food make upon the system generally. 'Specific differences are distinguishable in the chyme at least, if not in the chyle, according as the food from which it is formed has consisted of vegetable or animal matter, and according as it has contained fatty or oily substances, or been destitute of them.' Nevertheless as those substances alone contribute to the nourishment of the body by being assimilated by it which can be resolved into *their organic molecules*, and as these are only found in the proximate principles of animals and vegetables, of which principles none perhaps are exclusively animal, it seems most advantageous to treat at the outset of the principles, without reference to the source whence derived. The molecules can only be liberated by being diffused through some fluid, and therefore it matters not whether they be brought into such a condition by external agency or by the apparatus with which the higher animals are furnished, viz. the teeth, stomach, &c. To a fluid state they must be brought before they can pass the fine strainers of the alimentary canal. The resolution of the materials of food into their organic molecules is the real office of the digestive organs, while exercising that function within healthy limits: the resolution of the proximate principles into their elementary or ultimate principles, when various gases are evolved, is a morbid or diseased action of these organs.

The proximate principles of alimentary substances consist sometimes of three, sometimes of four elementary or constituent principles. Those which consist of three are of most frequent occurrence in the vegetable kingdom; those which consist of four are of most frequent occurrence in the animal kingdom. Where the elements are three only they are generally oxygen, hydrogen, and carbon; where four, oxygen, hydrogen, carbon, and nitrogen, or azote. The predominance of carbon is the characteristic of vegetable matter; the predominance of nitrogen the characteristic of animal matter. Wherever nitrogen is absent in animal matters the substance approximates, or is analogous to, vegetable matter, such as animal fats, which closely resemble vegetable oils. Animals which are decidedly carnivorous do not prosper if kept long on food destitute of azote, but man, whose dwelling-place is under different climates, can dispense with an azotized diet better in some parts of the world than in others, for instance, better in tropical countries than near the poles. The pilgrims and attendants on the caravans in their journeys across the deserts of Africa can subsist for a length of time on gum, which does not contain azote. Majendie, who carefully investigated the subject, concludes from his experiments—1st, That animals derive the azote which enters into their composition entirely from their food, and hence, that no animal can live for a considerable time on food entirely destitute of azote. 2nd, That animals, even those naturally carnivorous, can live a certain time upon food entirely destitute of azote, in consequence of which the excretions of those naturally carnivorous become altered, throwing off less azote than when they are fed on animal food, and acquiring the properties which these excretions have in animals whose food contains a very small proportion of azote. 3rd, That vegetable and animal substances destitute of azote are highly nutritious, provided at the same time azote can be supplied from some other aliment containing it, though in small proportion. It seems however that vegetable aliments acquire an accession of azote in the digestive organs, though probably at the expense of some part of the system. Admitting the general correctness of Majendie's views, alimentary substances may be divided into three classes.

I. Those which contain azote, carbon, oxygen, and hydrogen.

II. Those which contain carbon, hydrogen, and oxygen.

III. Those which contain neither azote nor carbon.

The first class naturally demands the greatest share of attention, because 'the aliments which contain azote correspond with animal substances in general, and are calculated to repair the waste of our solids and fluids without great alteration or effort in the digesting organs. All the immediate principles of this class are not however equally digestible, or possessed of the same properties.' It is necessary therefore to say a few words on the leading forms or states in which azotized principles occur.

I. *Fibrin.*—This is found in greatest abundance in the animal kingdom, constituting the principal part of the muscular fibre of animals, and no inconsiderable portion of the blood, when by rest that fluid is coagulated. It has been thought to exist in some of the constituents of the vegetable kingdom, particularly in the juice of the fruit of the Carica Papaya, or papaw-tree, and in certain other plants with a milky juice, such as the Palo de Vaca, Cow-tree (Galactodendron utile) of South America, and in some fungi, or mushrooms. The identity of the principle found in these vegetables with animal fibrin has been questioned by some recent chemists. Dr. Thomson considers the principle of the cow-tree distinct, and terms it galactin, while Gmelin terms that of the others emulsin, which he considers analogous to gluten.

Fibrin constitutes the chief part of the solid matter of the muscles of animals, particularly of those which are old and have dark-coloured dry flesh: it is that portion which re-

mains in the form of fibres after all the soluble matters have been removed from the flesh of animals by long boiling. It is insoluble in cold water, is corrugated by long boiling in water, is insoluble in alcohol, but strong acetic acid causes it to swell considerably, rendering it transparent like cartilage, in which state it may be dissolved, or, at least, diffused through water by long boiling.

The flesh of animals is divided into white and coloured, and indeed it differs in the same animal at different ages, having different accompanying constituent principles at different periods of life. Thus in the calf the muscles are white, or only pinkish; in the ox they are deep red; in the first state much gelatin and little of osmazome is present; hence the gravy of veal easily gelatinizes, while that of beef rarely does so.

Fibrin is in general more tender, that is, more easily digested, because the force of aggregation is more easily overcome by the powers of the stomach in middle-aged than in old animals, and in the flesh of the female than that of the male, unless the males have been castrated when young.

Albumen is another important constituent of animal bodies, but of more sparing occurrence in vegetable substances. In animal substances it occurs in two states, fluid and coagulated. The most perfect examples of it in the former state are the white of eggs, which is an alkaline solution of albumen, and the blood, which is likewise probably an alkaline solution of albumen. Coagulated albumen constitutes cartilage, horn, hair, and the nails or hoofs of animals. It forms the chief constituent part of oysters, muscles, snails, &c. Milk is an albuminous fluid.

At the temperature of 165° Fahr. albumen is coagulated, and it is likewise solidified by many acids, such as that of the gastric juice (in the form of rennet), and by some metallic salts. Milk, though coagulated by acids, is not so by boiling.

Albumen is likewise found in the green feculæ of plants in general, and in some vegetables in very considerable quantity, such as the fruit of the Hibiscus esculentus, or Ochro, and the bark of the Ulmus campestris, or elm. The former is used in Sicily to thicken soups, and both are used in the West Indies to clarify sugar.

Gelatin abounds in most animal substances, and is common in proportion to the youth of the individual. It exists in bones, ligaments, tendons, membranes, skin, muscles, as well as in a portion of the horns of animals. The skin of fish, much of their substance, and the swimming-bladder of the sturgeon are formed of gelatin. It is remarkably bland and nearly insipid, as may be remarked in any solution of isinglass. Gelatin is not of common occurrence in the vegetable kingdom, and it is distinct from vegetable jelly. It occurs however in the Protococcus nivalis.

Gelatin is the opposite of albumen in its qualities; in cold water it swells, is not transparent, is soft, and somewhat elastic. The gelatin of isinglass and of young animals is slowly but completely soluble in scarcely tepid water, while that of old animals, of skins, and of hoofs or feet, requires warm water for its solution. The solution, when of a certain strength, gelatinizes into a tremulous or solid jelly. It is a highly nutritious principle, but its digestibility is, in popular estimation, much overrated.

Mucus is a principle probably found only in animal structures, unless it exists in some plants of the tribe of Boraginaceæ. It differs from albumen principally in not being coagulable by heat, while it differs from gelatin in not being precipitated by vegetable astringents, though tannin coagulates the watery combinations of mucus: neither does a concentrated solution of it gelatinize on cooling. Mucus is a constituent of most of the secretions of animals, particularly of the membranes termed mucous. It is deemed both nutritious and of easy digestion.

Osmazome, animal extractive, or alcoholic extract of flesh, is deemed the principle to which meat owes its sapid taste and odour when dressed. Berzelius is disposed to refer these qualities to a watery extract of flesh, which he terms *zomoidin*. Osmazome is by no means a simple, but, on the contrary, a very compound substance, consisting of at least two different extractive materials, lactic acid, several salts, alkalies in combination with hydrochloric acid and lactic acid, &c.

It is probably limited to the animal kingdom, though a substance strongly analogous to it is found in many mushrooms, or fungi, viz. the common mushroom (Agaricus campestris) the A. muscarius, A. bulbosus, A. theiogalus, and in the sporidia of the Elaphomyces officinalis. This principle is not soluble in alcohol, and to distinguish it from ozmazome it is termed Pilzosmazom; to it different fungi owe, when dressed, their savoury odour, resembling that of animal food, and probably a portion of their nutritious property.

Osmazome exists sparingly in young and white meats, which consequently are deficient in savour; it is more abundant in that of animals of which the flesh is red, such as beef and mutton; it exists chiefly in the fibrous organs, or combined with fibrin in the muscles, but the tendons and gelatinous organs are, in a great measure, destitute of it. Animals with dark-coloured flesh, such as the hare, and different kinds of game, possess most, and hence are much esteemed by the lovers of savoury viands.

Gluten is, of all vegetable principles which occur in considerable quantity, the one which contains most azote, having from 14 to 20 per cent. Cafeine, or the alkaloid of coffee, possesses a much larger proportion. Gluten is met with, associated with starch and other matters, in the seeds of the cereal grains, in several other seeds, in many fruits, and in all green and other sappy parts of plants which yield feculæ. When separated from the principles with which it is usually associated, it is, when moist, a white, soft, elastic, and highly glutinous substance (bird-lime); when dry, it is white or whitish grey, hard, of a dull shining and conchoidal fracture. It is without smell or taste, insoluble in and heavier than water. Under ordinary circumstances, about a fourth part of what is termed gluten consists of a principle called *gliadin*. What remains after the removal of this and other matters present with it, is, according to Taddei, pure gluten, which he names zymoian. In the fleshy seeds of pulse, such as beans and peas, exists a substance resembling gluten, called *legumin* and also *vegeto-animal substance*.

Gluten is found in many esculent plants, such as the leaves of cabbages and cresses, and other edible cruciferous vegetables. Of the nutritious powers of gluten, separate from the starch, fat, gliadin, &c., with which it is always associated, nothing certain is known. In a state of combination, such as that of wheat-flour, it is highly nutritious. Such also is the character of the seeds of peas, beans, and other edible pulse.

Fluids which contain at the same time any of the varieties of sugar and gluten, or gluten-like principles, are capable, under favourable circumstances, of undergoing the vinous fermentation. A kind of fermentation occurs, by the agency of the gluten, in the conversion of wheat-flour into bread.

Emulsin (vegetable albumen, vegetable casein, or amygdalin) occurs in most of the elaborated juices of plants, and in many dry parts of plants, viz. in all oily seeds which when triturated with water form an emulsion. The real nature of this principle is not clearly ascertained. Many chemists deem it identical with animal albumen; others consider it identical with the casein of the milk of animals; while others pronounce it to be gluten. To Gmelin it appears distinct; he has accordingly given it the above name.

II. Proximate principles which consist of oxygen, hydrogen, and carbon.

Gum is a principle of vegetables, in all of which, but mostly soft parts of them, it is found; in some, however, it abounds so much as to form their chief characteristic; they are thence called mucilaginous, or gummy, such as the carrot, parsnip, &c. Gum is colourless, but from admixture of other matters it is often of a yellow or brownish hue, transparent or translucid, of an insipid rather sweetish taste, and not crystallizable. When pure, it is entirely soluble in water, whether warm or cold, forming with it a tenacious fluid; it is insoluble in alcohol. In the state of solution in which it occurs in plants, of which it forms the chief material for their nutriment, it is termed *mucilage*. From some trees, either by spontaneous cracks or incisions, it exudes and concretes on the bark, as is seen in the various acacias, which yield the *gum arabic*, the plum, and cherry trees, &c. There is some difference in chemical character in the various sorts of gum, according to the plant which yields it, but these scarcely affect its nutritive properties. The principle which is found in many fruits, such as the gooseberry, currant, orange, &c., which is *vegetable jelly*, is regarded as a kind of gum, though designated *pectin*. This is neither acid nor possessed of basic properties, and the reason why it so often seems sour is by being united

with vegetable acids (malic, citric, &c.), which communicate to the juices of these fruits their taste, and also enable them to redden litmus paper. The grateful and cooling properties of such fruits is therefore chiefly due to the vegetable acids, while their nutritious qualities depend upon the pectin and other principles.

Mucilaginous vegetables are rarely fit for use when growing wild; but they are much ameliorated by the processes of horticulture, having their bulk increased and their qualities improved. Those which are bitter or narcotic, as endive, lettuce, sea-kale, &c., being by blanching rendered mild and safe, or by being served to table while young, as asparagus. The difference in flavour of such vegetables is due to the principles with which the gum is associated; but their nutritive properties are owing to the gum, which even when taken alone, though mawkish, and at last repudiated by the palate, is certainly adequate to the support of the human frame for many weeks or perhaps months. During the harvest of gum at Senegal the Africans live entirely upon it, eight ounces being the daily allowance for each man. In general they become plump on this fare, and indeed such should be the result, if the calculation be correct which assigns as great nutritive power to four ounces of gum as to one pound of bread.

Sugar is a principle much more abundant in vegetable than animal fluids; it exists however in small quantity as a constituent of the bile, and in the milk of many animals; and it is formed in large quantity as a product of perverted action of the digestive and assimilating organs, in the disease termed diabetes. [DIABETES.] In chemical composition sugar does not differ greatly from gum, except in having a greater proportion of carbon. This additional proportion however is sufficient to confer upon it considerable differences in character. Sugar is of different kinds, according to the plant which yields it, and according to the part of the plant from which it is obtained. Sugars are therefore divided into those which are crystallizable and those which are not, and likewise into those which are susceptible of fermentation and those which are not so. The sugar of the sugar-cane is the most perfect example of those kinds which are both crystallizable and capable of undergoing fermentation; sugar of milk and mannite are examples of the second class. A remarkable feature presents itself in sugars of the first class; for, while susceptible, when dissolved in sufficient water, of the vinous or acetous fermentation, they greatly assist, when concentrated, in preserving vegetable substances, either when naturally present in them, as in many fruits, grapes, raisins, prunes, &c., or when added artificially in making conserves, jellies, &c. Those fruits which grow in seasons favourable to the elaboration of much saccharine matter in their tissues not only keep better, but are more wholesome than when grown in less favourable years.

Honey contains a variety of sugar, which is both nourishing and capable by fermentation of yielding mead, which was long the favourite beverage of the antient Britons. Many fungi, or mushrooms, contain a peculiar kind of sugar, which contributes to render them nutritious.

Starch possesses a larger proportion of carbon than sugar and gum: by removal of this additional proportion of carbon it is reduced to the state of one or other of those principles. This process of reduction occurs spontaneously in the course of flowering in plants, and in the stomach during digestion. When combined with gluten, it is susceptible of fermentation, and by undergoing the *panary* fermentation forms bread, one of the most important articles of food in civilized life. As this is ordinarily managed, some portion of the flour is made to yield up a certain amount of its carbon; but the precise nature of the change which the flour undergoes during this action is not clearly understood. The digestibility of the flour is however greatly increased by this process; and by various admixtures, chiefly of common salt, the taste is improved.

Starch exists largely in plants, but more abundantly in some parts than others; such as many seeds, particularly of the cereal grains, rice, barley, maize, and millet, in which it occurs in great purity; in wheat along with gluten; with saccharine matter in oats, and some leguminous seeds; with a viscid mucilage in potatoes, rye, and Windsor beans, and occasionally with an acrid principle, which can generally be dissipated by heat, as for example the Jatropha Manihot, which yields tapioca. Though seeds and roots yielding starch in abundance are all comprehended under the term *farinaceous*, there are essential differences between them according to the principles with which it is associated, which cause them to differ in their digestibility, and consequently in their eligibility and suitableness for different ages and individuals Flour, starch, arrow-root, cassada-flour, or tapioca, salep, sago, and other similar preparations, are all merely varieties of the same principle. Starch is not only highly nutritive, but one of the blandest and most wholesome articles of diet, capable, in due proportion, of being used for the food of tender infancy, and not improper at any subsequent period of life, though during youth and manhood it requires other principles to be taken along with it.

Oils and *fat*, however much unlike in some respects to the other principles arranged under this head, are formed out of precisely the same constituent elements; and during digestion the stomach brings even the most apparently dissimilar into a degree of relationship more intimate than might have been anticipated. The chief difference between them and the alimentary substances already mentioned is in their greater proportion of hydrogen. Sugar and starch are both susceptible of fermentation, during which a portion of carbon is removed from each by combining with oxygen and escaping in the form of carbonic acid gas. From starch, in the early stages of fermentation, one proportion of carbon is taken, which brings it to the state of sugar, from which again a proportion of carbon and of oxygen is taken, and alcohol produced, the hydrogen remaining undiminished in quantity: and as alcohol is merely an oleaginous body of a weak kind, the analogy is complete; for all farinaceous and saccharine aliments undergo changes in the digestive organs before they can be assimilated in the system, similar to what occurs in fermentation, viz. being converted into oil. [DIGESTION.]

Oils are insoluble in water, and therefore, though highly nutritive, they are not available for the support of the body till their immiscibility with water has been overcome. Hence they are apt to oppress the stomach during the early stages of digestion, if taken alone without being mingled with substances which facilitate their union with water. When this is accomplished they are very readily assimilated, as, according to Dr. Prout, 'albuminous and oleaginous principles may be considered already fitted for the purposes of the animal economy without undergoing any essential change in their composition.'

Oils are either fluid or concrete, and both forms occur in the animal and vegetable kingdoms, though in the latter they are most generally fluid.

Acids are present in many vegetable substances which affect the digestive organs in various ways, though they may not contribute directly to the nourishment of the system.

III. Alimentary principles which do not contain carbon.

Water is the only one of these which it is necessary to notice. This is essential to the existence of all organized beings in whatever way it is introduced into their tissues. Not only is it introduced by human beings in the state of common water, and many beverages of which the chief part is water, but our ordinary articles of animal food contain, on an average, seventy-five per cent. of water, and only twenty-five per cent. of nutritive matter; and many of our vegetables contain a still larger proportion.

Such are the chief principles employed by man in a state of civilization for his subsistence. But it is not enough that a sufficient quantity of one or more of these be swallowed. The function of digestion must be called into action to enable the crude materials to be assimilated. This is partly excited by the mere presence of a substance in the stomach, but more effectually when that substance is in itself of a stimulating quality, or is accompanied by certain accessories either added during the preparation of the food or at meal-times. Such accessories are termed condiments, which either make the food more grateful, or exercise a beneficial influence over the stomach during the process of digestion. The desire to eat is rarely so great when insipid food is offered to an individual as when savoury viands are presented. The very odour or aroma of these excites the salivary glands to more abundant secretion of saliva, which is a preparation for the digestion of the food about to be taken. Though the mere application of heat in the process of cooking develops an aroma from many substances which were previously devoid of it, either by altering the chemical composition of the material, or by volatilising a principle latent in the substance, yet many

adventitious articles are used to assist in increasing or modifying this odour, or to correct certain qualities in particular kinds of food which are either disagreeable or injurious. Respecting the most common of these a few words may be allowed. That condiment which is of most universal requirement and utility is salt, or chloride of sodium. It is the only one which is indispensable, for not only does it exist in the milk which forms the earliest nutriment of the infant, but at all subsequent periods of life it is needed. Independently of the part which this compound performs in the stomach during digestion, it is still further serviceable in the blood, and more so in the blood of man than of any other being, as Berzelius has remarked that the blood of man contains three times more hydrochlorates than that of the ox. Besides, the use of salt greatly benefits the alimentary canal and hinders the generation of worms. [ANTHELMINTICS.] It is one of the most ready means of rendering insipid food acceptable to the palate, as is noticed in one of the earliest compositions which have come down to us. 'Can that which is unsavoury be eaten without salt?' (Job. vi. 6.) Perhaps the next most important condiment is vinegar, which, like most vegetable acids, when taken in moderation, greatly assists in promoting the digestion of young meats of a gelatinous kind, such as veal.

Mustard and peppers of different kinds are also useful, and more so in warm than cold countries, as they rouse the languid stomach, and enable it to effect the digestion of the food. Hot pickles, from containing vinegar at the same time, are often advantageous when used in moderation, but the abuse of such articles produces many serious effects, particularly obstruction of the liver, with its long train of disorders. The use of spices and aromatic agents not only renders the food more pleasant, but enables the stomach to bear a larger quantity. Hence they are too often made the means of leading the gourmand to be guilty of excess; and that cook is often most prized who can most cunningly minister to the pampered appetite. This is perverting cookery, a highly proper and commendable art, from its legitimate end. 'In the hands of an expert cook, alimentary substances are made almost entirely to change their nature, their form, consistence, odour, savour, chemical composition, &c.; every thing is so modified that it is often impossible for the most exquisite sense of taste to recognise the substance which makes up the bases of certain dishes. The greatest utility of the kitchen consists in making the food agreeable to the senses, and rendering it easy of digestion. But its perfection seldom stops here: frequently among people advanced in civilization the object to which it aspires is to excite the appetite, to appease capricious palates, or to satisfy luxurious vanity. Then, far from cookery being a useful art, it becomes a real pestilence, carrying with it a train of diseases, and not unfrequently the premature death of many of its infatuated votaries.' (Majendie's *Physiology*.) [MILK; WATER; WINE.]

FOOD, PRESERVATION OF. [ANTISEPTICS.]

FOOD OF LABOURERS. It has been justly asserted by Dr. Paley that, inasmuch 'as the state of population is governed and limited by the quantity of provisions, perhaps there is no single cause that affects it so powerfully as the *kind and quantity* of food which chance or usage has introduced into the country.' (Paley's *Works*, 1819, vol. ii., p. 71.) The importance of the subject is here sufficiently proved. The inquiries that have been instituted for purposes connected with the alteration of the poor-laws have directed the attention of many persons to this subject. It is obvious that individuals differ in their capacities for food; that climate affects the desire and necessity for food as well as the nature of the employment. Nevertheless, says Mr. Mott (*Report of the Poor Law Commissioners*, 1836), 'I submit that, although, even for persons in full health, it would be difficult, perhaps impossible, to establish any given daily quantity of food to suit the capabilities of every stomach, it is possible so to classify them as to form a tolerably correct rule for the whole. I have been led to believe that the result shown in the following scale may be considered as a fair estimate of the proportions of food requisite to support human life in a sound and healthy state.'

'1st. For persons of moderate health and constitution, but using little exercise or exertion: daily allowance of food 12 to 16 ounces; in nutritive matter equal to an average daily of 10 ounces. 2nd. For persons of good health accustomed to moderate labour, as sailors and soldiers on ordinary peace duty, or agricultural labourers or mechanics at their usual work: daily allowance of food 18 to 24 ounces; in nutritive matter equal to an average daily of 16 ounces. 3rd. For persons subject to hard labour or other violent exertion, in good bodily health: 24 to 30 ounces of food; equal to 22 ounces of nutritive matter. The foregoing calculations have been taken indiscriminately, and I have reason to believe that they will bear the test of examination.' By a consideration of these data, and the price of provisions at such markets as the owners of a very small capital are enable to purchase at, a judgment may be formed of the condition of a labourer. So far regarding the *quantity* of food requisite; the *quality* varies according to the local position of the labourer. Mr. Senior, in his 'Statement of the Provision for the Poor, and of the Condition of the Labouring Classes in a considerable portion of America and Europe' (Fellowes, 1835), gives the result of his inquiries into the food of foreign labourers. We extract the following information from his pages:—

Quality of food used by an agricultural labourer having a wife and four children.

AMERICA. *New York.*—Tea, coffee, meat twice a-day.

Massachusetts.—Poultry, meat, or fish, twice or thrice a-day.

Mexico.—Maize prepared either in porridge or thin cakes, and beans, with chile, a hot pepper, of which they eat large quantities as seasoning.

Carthagena de Columbia.—Chiefly animal food.

Venezula.—Maize, vegetables, and fruit.

Uruguay.—Animal food.

Hayti.—Plantains, sweet potatoes, and other vegetables.

EUROPE. *Norway.*—Herrings, oatmeal porridge, potatoes, coarse oatmeal bread, bacon and salt beef perhaps twice a-week. Fish on the lakes and rivers. Brandy in general use.

Sweden.—In the south potatoes and salt fish; in the north porridge and rye bread.

Russia (general return).—Rye bread, buckwheat, and sour cabbage, soup seasoned with salt and lard.

DENMARK. *Copenhagen.*—Rye bread, inferior coffee, cheese, and butter.

Elsinore.—Rye bread, groats, potatoes, coffee, butter, cheese, and milk.

HANSEATIC TOWNS. *Lubeck.*—Rye bread, potatoes, bacon seldom, peas-porridge, groats, cheap fish.

Bremen.—Potatoes, beans, buckwheat, groats, rye bread, meat about twice a-week.

Mecklenburg.—Good sound food, occasionally meat.

Danzig.—Chiefly rye bread and potatoes, meat once or twice weekly.

Würtemberg.—Soup, potatoes, bread, meat once or twice a-week.

Frankfort.—Soup, potatoes, vegetables, bread, coffee, and beer daily, meat on one or two days.

Holland (general return).—Rye, cheese, potatoes, vegetables, beans and pork, buttermilk, buckwheat, meal, &c.

BELGIUM. *Boom.*—Bread, potatoes, and milk.

Ostend.—Potatoes and bread in the towns; in the country a little butter, vegetables, and sometimes a piece of pork.

Goesbek.—Rye bread, cheese, butter or fat, bacon, vegetables, coffee, and weak beer.

FRANCE. *Hâvre.*—Bread, vegetables, cider, very rarely animal food; coffee and treacle are also used.

Brittany.—Buckwheat, barley bread, potatoes, cabbages, and about 6 lbs. of pork weekly.

La Loire Inférieure.—Bread and vegetables, bacon or other meat now and then.

Bordeaux.—Rye bread, millet soup, Indian corn, sometimes salt provisions, butchers' meat very rarely.

Marseilles.—Vegetables, bread, farinaceous substances made into soup, meat soup or bouillie probably once a-week.

Piedmont.—No meat, little wine, twice as much maize as wheat flour.

Portugal.—Salt fish, vegetable soup, with oil or lard, maize bread.

The Azores.—Maize bread, vegetables, potatoes, and fruit, meat seldom, fish when abundant.

Greece; Patras.—Maize or wheaten bread, olives, pulse, vegetables, salt fish, meat occasionally.

European Turkey.—Bread, rice, greens, dried beans and peas, olives and onions, meat about once a-week.

Malta (from a communication).—Barley bread, cheese, carob, or other beans, and soup of maize or millet with

herbs, when in employ · when out of employ, a little bread and soup only.

Although these returns are general, and each statement comprehends a considerable surface, the information that they give is sufficient to enable the reader to form an idea of the condition of labourers in the different countries referred to. The food of English labourers consists principally of wheaten bread (which was unusual before the beginning of the eighteenth century), cheese, and potatoes, with bacon or butchers' meat once at least in the week. Cider or beer is frequently provided, according to agreement; and an increased quantity both of meat and drink is given during harvest. The following account was stated by Mr. Wallace in evidence before one of the Irish assistant poor law commissioners to be the weekly expenditure of a labourer whose wages were 9*s.* a-week, and whose family consisted of himself, his wife, and two children. The information had been derived from a labourer in that condition:—

	s.	*d.*
Two pecks of oatmeal, at 9*d.*	1	6
Five do. of potatoes, at 5*d.*	2	1
Milk	1	0
Loaf of bread	0	6
¼ oz. of tea, and sugar ½ lb.	0	5
1 lb. of bacon	0	6
Herrings or other fish .	0	6
Coal, oil, and soap . .	1	0½
Tobacco	0	3
Rent	1	0
	8	9½

Oatmeal and oaten and barley bread are in common use among the Scotch, and salt fish and salted meat are occasionally obtained. The food of the Irish labourers consists almost uniformly of potatoes, with which they are frequently unable to afford salt. A herring or a small portion of salt meat, milk, or buttermilk, are luxuries within the labourer's occasional reach; but, on the other hand, families are sometimes compelled to subsist upon the coarsest potatoes alone; and we have heard it stated, upon authority which cannot be doubted, that rents have been raised because the tenant has been seen to eat 'apple-taters'—potatoes of the best sort—the landlord considering that their quality was too good for the consumer, who should have sold them for his benefit and substituted coarser in their place.

The introduction of the potato as the general food of labourers necessarily works a great change in the country where it is adopted. As long as it is only an auxiliary to food it will not be mischievous; but when it becomes the staple evil will arise in the following manner.—The produce of an acre of potatoes will maintain at least twice as many persons as a similar surface of wheat. The population consequently will be increased; but neither will potatoes keep from year to year, nor can they be carried great distances. They therefore vary greatly in price; for the surplus crop of one year or place cannot supply the deficiency of another. It has been stated in evidence before the House of Commons that the price at some periods has been sixfold what it has been at others. Let a famine arise, and there is no cheaper food, no resource whatever to be resorted to. (See M'Culloch, *Notes to Adam Smith*, p. 163.) The British and Irish labourers certainly prefer a large quantity to an improved quality of food, and will make no alteration in its quality until they have a large superfluity in quantity. Their chief meal is a supper after the day's work is over. The inducements that are offered to the labourer by the low price of spirits and the increased number of cider and beer-houses to spend the small surplus of his income in drinking are proved to be successful by the large amount of spirituous and fermented liquors now consumed. The miseries of this indulgence on the part of the head of the family are not confined to the husbands and wives of the lowest labourers, but the families of artisans are often equal sufferers. An examination of the causes of destitution in the parish of Spitalfields, where the number of general charities is unusually large, elicited the following fact. While weavers earning wages of 20*s.* and more than 20*s.* a-week were consuming their wages in intoxication, their wives and families could only afford themselves the following subsistence. An itinerant dealer was their commissary. This man, called by the appropriate name of 'Jacky All Sorts,' received into his wash-tub the refuse meat and fat with the scrapings of dishes and plates from neighbouring cook-shops, and afterwards found customers for this filth among the families of the silk-weavers.

In the 'Report of the Commissioners for Inquiring into the Administration and Operation of the Poor Laws' (1834), Mr. Chadwick states that an independent labourer was then unable to get in the shape of solid food more than an average allowance of 122 oz. per week.

A soldier . . .	168 oz. per week.	
An able-bodied pauper, together with other luxuries, about .	151	,,
The suspected thief (see Gaol Returns from Lancaster) .	181	,,
The convicted thief . .	239	,,
The transported thief .	330	,,

It is obvious that it was desirable that this table should be reversed. The independent should be better off than the dependent labourer, the dependent labourer than the suspected thief, the suspected than the convicted thief. With a view to this result, the dietaries of many gaols have been amended, and the poor law commissioners have provided that a sufficient but not an excessive quantity of food should be distributed in the union workhouses. In their Report for 1836 six dietaries have been printed (p. 64). The quantities contained in the first are as follows:—

	Bread.	Gruel.	Cooked meat.	Potatoes.	Suet or rice pudding.	Cheese	Broth.
	lbs oz	Pints.	oz.	lbs.	oz.	oz.	Pints
For each Man per week . .	5 4	10½	15	1½	14	8	9
For each Woman per week .	4 6	Do.	Do.	Do.	12	Do	Do.

Wheaten bread is used in all workhouses. It would be difficult, for want of accurate, precise data, to estimate the comparative welfare of labourers now and at earlier periods, we are, however, inclined to think that the condition of agricultural labourers has seldom been better than in the years 1834-5-6.

(*Reports of the Poor Law Commissioners*; Senior's *Foreign Poor Laws*; Sir F. Eden's *State of the Poor*, &c.)

FOOLS, FEAST OF. This was a festival anciently celebrated in different churches and monasteries of France upon New Year's day, from a very early period, when every kind of absurdity, and even indecency, was committed. It is supposed to have had its origin in the saturnalia of the Romans. The council of Basle in 1435 expressed its detestation of this and several other festivals which were then celebrated, and its abolition, at least in one district, was ordered by an arrêt of the parliament of Dijon in 1552. The reader who would know more of this festival may consult Du Cange's 'Glossary, *v.* KALENDÆ,' and Du Tilliot's 'Mémoires pour servir à l'Histoire de la Fête des Foux, qui se faisoit autrefois dans plusieurs Eglises,' 4to., Lausanne et à Genève, 1741.

FOOLS' PARSLEY. [ÆTHUSA.]

FOOT. [MEASURES.]

FOOT-BALL, a ball made of a blown bladder cased with leather to be kicked by the foot; used by metonymy for the diversion of driving the ball itself. This was an early and favourite sport with the English. Fitzstephen mentions it among the games of the Londoners in the time of Henry II. Pepys, in his 'Memoirs,' vol. i. p. 324, A.D. 1664-5, says, 'January 2, to my Lord Brouncker's by appointment in the Piazza, Covent Garden: the street full of foot-balls, it being a great frost.' Brand (*Popular Antiq.*, vol. ii. p. 79) says, in the north of England, among the colliers, it is customary to watch the bridegroom's coming out of church after the ceremony, in order to demand money for a foot-ball.

FOOTE, SAMUEL, was born at Truro, in the county of Cornwall, but the date of his birth is not exactly known. His father was member for Tiverton, and he was educated at Worcester College, Oxford. On quitting the university, he commenced the study of the law, which his volatile disposition prevented him from pursuing. About the same time he married a lady of good fortune; but the marriage turned out unhappily, and he plunged into all the vices of the town, particularly gaming. His fortune being speedily exhausted, he turned player from necessity, and made his first appearance in the character of Othello, in which he

produced no great sensation. Though he was more successful in comedy, he did not much distinguish himself as an actor till he began to perform parts of his own writing. His difficulties increasing, he was only extricated from them by Sir Francis Delaval, who allowed him an annuity for a not very honourable piece of service. Sir Francis was himself of ruined fortune, and had looked forward to a marriage with a rich lady as the means of repairing it. Foote, discovering a wealthy dame who was prepossessed with fortune-tellers, got a friend to personate a conjuror and recommend Sir Francis as a husband. The scheme succeeded, and Foote was rewarded as above mentioned.

In 1747 he opened the little theatre in the Haymarket, and here commenced his career as an author, by writing for his own house the succession of short pieces by which he is so well known. He did not, however, obtain a patent till 1766, when, riding out with the duke of York, he broke his leg by a fall from his horse, and was forced to have it amputated; the patent was procured by the duke as a sort of compensation for this accident. Foote did not retire from the stage on account of the loss of his limb, but acted with a cork leg. His death is said to have been accelerated by the shock he received on a servant preferring against him a charge of the worst nature; he was tried and honourably acquitted, but seems never to have recovered his spirits. Feeling his health decline, he let his house to Mr. Colman, still occasionally appearing as an actor. While performing one of his characters he was seized with paralysis on the stage. He went to Brighton for his health; and on his return to London he set out for Paris, but died on his way, at Dover, in 1777.

Complete editions of Foote's works are easily procured; but scarcely a single piece is now produced on the stage. In fact, notwithstanding their great merit, they refer so much to the humours and often the persons of his own times, that they now possess rather an historical than a dramatic interest, and will be read by few except those who are desirous of having a view of the striking characters in the latter part of the last century. The Methodists are lashed in 'The Minor;' the passion for travelling in 'The Englishman returned from Paris;' the newspapers in 'The Bankrupt;' the debating societies in 'The Orators;' the bar in 'The Lame Lover;' and in general every piece has its peculiar object of satire. In making his characters stand prominently forth, Foote is not excelled; but, like most depictors of humours, he occasionally falls into the error of giving abstractions rather than probable persons. The pieces which kept the stage longest are 'The Mayor of Garratt' and 'The Liar,' the humour of which is not so exclusively adapted to a particular time.

FORAMINI'FERA. An order established by M. D'Orbigny for certain foraminated polythalamous internal shells which have no chamber beyond their last partition. They have no siphuncle; but their chambers are supposed to communicate with each other by means of many small foramina. This order is placed by M. D'Orbigny as the third of the *Cephalopoda;* but M. Dujardin has made observations on the living animals of some of the species, which induce him to assign these testaceous forms to a new class of animals inferior in their organization to the *Radiata*, and endowed with locomotive power by the instrumentality of minute tentacular filaments. For this class he proposes the name *Rahizopoda*, and under that title it is intended to give the reader the results of his researches when fully carried out At present we shall merely draw the reader's attention to M. D'Orbigny's arrangement of these curious minute shells which exist in myriads on the sea-coasts. The species found in the European ocean are comparatively few, and their size is very small; but the Adriatic abounds both in genera and species which are larger. The greater number are microscopic. The fossil species are most abundant in the tertiary formations, especially in Italy. The chalk of Meudon, in the Jura limestone of the Charente Inférieure, and the oolite of Calne, contain them. Count Munster reckons forty species from the cretaceous freestone of Maestricht. Mr. Lonsdale enumerates sixteen species from the English chalk, and the marquis of Northampton found them in chalk flints from the neighbourhood of Brighton. Some idea of the myriads which now occur together in particular localities in a fossil state, and once swarmed in life throughout the antient seas, may be gained from the following passage in Dr. Buckland's *Bridgewater Treatise*, descriptive of one genus only:—'Nummulites are so called from their resemblance to a piece of money; they vary in size from that of a crown-piece to microscopic littleness, and occupy an important place in the history of fossil shells, on account of the prodigious extent to which they are accumulated in the later members of the secondary, and in many of the tertiary strata. They are often piled on each other nearly in as close contact as the grains in a heap of corn. In this state they form a considerable portion of the entire bulk of many extensive mountains, *e.g.* in the tertiary limestones of Verona and Monte Bolca, and in secondary strata of the cretaceous formation in the Alps, Carpathians, and Pyrenees. Some of the pyramids and the sphinx of Egypt are composed of limestone loaded with nummulites. It is impossible to see such mountain masses of the remains of a single family of shells thus added to the solid materials of the globe without recollecting that each individual shell once held an important place within the body of a living animal; and thus recalling our imagination to those distant epochs when the waters of the ocean which then covered Europe were filled with floating swarms of these extinct mollusks, thick as the countless myriads of *Beröe* and *Clio Borealis* that now crowd the waters of the polar seas. Lamarck, in his observations on *Miliola*, remarks that these very minute animals have had much more influence on the masses which compose the surface or exterior crust of our globe than the remains of elephants, hippopotami, and whales.'

M. D'Orbigny has divided his *Foraminifera* into five families and has prepared magnified models, which are to be found in most collections, illustrating 100 species and all the 52 genera. Our limits will only allow us to give a mere sketch of his arrangement, as adopted by M. Rang.

FORAMINIFERA. (Asiphonoides of De Haan).

Family I. Les Stichostègues.

*

A single central opening.

Genus Nodosaria (Lamarck); Orthocera, Lamarck; Reophax; De Montfort.

This genus is sub-divided into many sub-genera.

1. Glandulina.
2. Nodosaria (properly so called).

Nodosaria contains numerous species both living and fossil, and is separated into two groups.

α

Shell not stirated longitudinally.

Example, *Nodosaria radicula.*

β

Shell stirated longitudinally

Example, *Nodosaria æqualis.*

3. Dentalina.

This sub-genus is also numerous and comprehends two groups.

α

Shell without longitudinal striæ.

Example, *Nodosaria communis.*

β

Shell longitudinally striated.

Example, *Nodosaria depressa.*

4. Orthocerina.
5. Mucronina.

Genus Frondicularia (Defrance) Renulina De Blainville).

Genus Lingulina.

**

Aperture Marginal.

Genus Rimulina.

Genus Vaginulina.

Genus Marginulina (Orthocera, Lamarck).

Genus Planularia (Defrance) Astacola? (De Montfort).

Genus Pavonia.

Family II. Les E'nallostègues.

Shell always composed of a porous tissue. Exterior rugose and covered with asperities.

*

Alternation of the chambers total or partial, regular.

Genus Bigenerina.

This genus is divided into two sub-genera.

1. Bigenerina (properly so called).
Aperture central.
2. Gemmulina.
Aperture marginal.
Genus Textularia.
Genus Vulvulina.

* *

Alternation of the chambers total or partial, but irregular.
Texture vitreous, very translucid.
Genus Dimorphina.
Genus Polymorphina.
Polymorphina is divided into the following sub-genera:—
1. Polymorphina (properly so called).
2. Guttulina.
3. Globulina.
4. Pyrulina.
Genus Virgulina.
Genus Sphæroidina.

Family III. Les Hélicostègues.
Section 1. Turbinoides.

*

Spire elevated: shell free.
Genus Clavulina.
Genus Uvigerina.
Genus Bulimina.
Genus Valvulina.

* *

Spire surbaissée.
Genus Rosalina (Cidarollus? De Montfort).
Genus Rotalia.
Rotalia, which is abundant in living and fossil species, is divided into the following sub-genera:—
1. Rotalia (properly so called).
2. Discorbis (Lamarck).
3 Trochulina.
4. Turbinulina.
Genus Calcarina (Siderolites, Lamarck; Tinoporus? and Cortalus? De Montfort).
Genus Globigerina.
Genus Gyroidina.
Genus Truncatulina. (Hammonia, Soldani; Polyxenes and Cibicides, De Montfort).
Section 2. Ammonoïdes.
Genus Planulina.
Genus Planorbulina.
Genus Operculina.
Genus Soldania.
Section 3. Nautiloïdes.

*

Chambers assembled on alternating axes; aperture towards the middle of the chamber.
Genus Cassidulina.

* *

Chambers not alternating or threaded (enfilées) on a single axis.

a

Sides unequal: one protuberant, the other flat.
Genus Anomalina.
Genus Vertebralina.

β

Sides unequal.
† Many apertures.
Genus Polystomella (Lamarck); Andromedes, Cellulia, Sporilus, Themeon, Pelorus, Geophonus, and Elphidium, (De Montfort).
Genus Dendritina.
Genus Peneroplis (De Montfort); Renulina, Placentula (De Blainville).
Genus Spirolina (Lamarck) including Lituites of the same author.

† †

A single aperture.
Genus Robulina. (Phonemus, Pharamum, Herion, Clisiphontes, Patrocles, Lampas, Antenor, Robulus, Rhinocurus, Spincterules; De Montfort.)
Genus Cristellaria (Lamarck); Linthuris and Oreas (De Blainville); Oreas and Scortimus (De Montfort); Saracenaire (Defrance).
Cristellaria is divided into two sub-genera.
1. Cristellaria (properly so called). Shell depressed.
2. The Saracenaires of Defrance. Shell convex.
Genus Nonionina. (Macrodites? Melonis, Cancris, Florilus, and Chrysolus; De Montfort.)
Genus Nummulina (Nummulites and Lenticulina; Lamarck. Helicites; De Blainville. Numulithes, Lycophris, Rotalites, Egeon; De Montfort).
Nummulina is separated into two sub-genera.
1. Nummulina (properly so called).
2. Assilina.
Genus Siderolina (Lamarck). Siderolithes (De Montfort).

Family IV. Les Agathistègues (Les Milioles; De Férussac.)

Genus Biloculina.
Genus Spiroloculina.
Genus Triloculina.
Genus Articulina.
Genus Quinqueloculina (Pollontes? De Montfort).
Genus Adelosina.

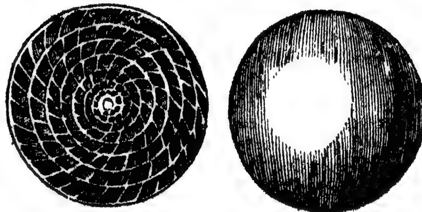
Family V. Les Entomostègues.

*

Sides unequal.
Genus Amphistegina.
Genus Heterostegina.

* *

Sides equal.
Genus Orbiculina (Lamarck); Helenis, Archaias, and Ilotes, (De Montfort).
Genus Alveolina (Alveolite); Bosc. Orizaire; Defrance. Borelis, Clausulus, and Milliolites; De Montfort. Fasciolite; Parkinson.
Genus Fabularia (Defrance).
The following example will serve as a general illustration of the family.



Nummulites lenticularis.

FORBES, DUNCAN, was the second son of Duncan Forbes of Culloden, near Inverness, where, or at another seat of the family, called Bunchrew, in the same neighbourhood, he was born 10th November, 1685. After studying law for some years at Leyden, he returned to Scotland in 1707, and was admitted an advocate 26th July, 1709. At the bar he rapidly gained employment and distinction. For his first public appointment, however, that of sheriff of Mid-Lothian, he was chiefly indebted to the friendship of the Argyll family. The rebellion of 1715 gave him an opportunity of displaying his zeal and activity in support of government; and to his influence and exertions, and those of his elder brother, who had now succeeded to the family estate, the maintenance of the public tranquillity throughout a great part of the north of Scotland at this crisis is considered to have been mainly owing. His services were rewarded the following year by his appointment to what was then called the office of deputy lord-advocate, which was similar to that of the present solicitor-general. In this office he did himself as much honour by the high-minded delicacy which he showed in conducting the trials of the persons charged with participation in the recent treason, as by the talent, activity, and courage he had displayed during the insurrection. The cry indeed that he was himself a disguised Jacobite was raised by the zealots of the government. In 1722 he was returned to parliament for the Inverness burghs, for which his elder brother had previously sat. In the House of Commons, of which he continued a member for the next fifteen years, he of course generally supported the minister, Sir Robert Walpole, as his official situation implied. In 1725 he was appointed

lord-advocate, the place of secretary of state for Scotland being at the same time abolished, and its duties devolved upon him. In 1737 he was placed in a still more conspicuous position by his elevation to the dignity of lord president of the court of session, or head of the civil judicature of his native country. A few years before this time the death of his brother had made him proprietor of the family estate. For the last twenty years of his life, Forbes was regarded as a sort of lieutenant-governor of Scotland; but besides the power which he exercised through his official connexion, he secured to himself a still wider influence by his public spirit, and his unwearied exertions in promoting the welfare of the country in its trade, its manufactures, its agriculture, its fisheries, its roads, and every other department in which any project of improvement suggested itself to his active and patriotic mind. 'Thee, Forbes, too,' Thomson, in his 'Autumn,' addresses him (pronouncing the name, it may be observed, in two syllables, as it is usually heard in Scotland),—

> 'Thee, Forbes, too, whom every worth attends,
> As truth sincere, as weeping friendship kind,
> Thee, truly generous, and in silence great,
> Thy country feels through her reviving arts,
> Planned by thy wisdom, by thy soul informed;
> And seldom has she known a friend like thee.'

The most memorable public exertions of President Forbes, however, were called forth by the rebellion of 1745. In this emergency he certainly contributed more than any other man to keep the rebels in check until the government was enabled to meet them in the field with an adequate military force. To the discredit of the ministry and the country, not only were his services never rewarded, but he was even refused any compensation for his actual losses and the expenditure of his private resources in the public cause. He had been attacked in his castle of Culloden by the rebels, who probably would have taken his life if he had fallen into their hands. It is said that his indignant sense of the ungrateful usage he met with broke his heart, and brought him to the grave. His death took place on the 10th December, 1747. He left an only son, by a lady whom he married soon after his admission to the bar, but whom he lost after a few years. President Forbes was a man both of extensive scholarship and of elegant accomplishments. Among other branches of learning he had cultivated an acquaintance with the Oriental tongues, and is said to have perused the Old Testament eight times in the original Hebrew. He is the author of the following pieces, which were published at Edinburgh in two volumes 8vo., soon after his death:—1. 'Thoughts on Religion, Natural and Revealed;' 2. 'Reflections on the Sources of Incredulity in regard to Religion;' of this Warburton, in a letter to Hurd, writes, 'It is a little jewel; I knew and venerated the man; one of the greatest that ever Scotland bred, both as a judge, a patriot, and a Christian;' 3. 'A Letter to a Bishop concerning some important discoveries in Philosophy and Religion.' To President Forbes are also attributed the elegant and well-known verses beginning—

> 'Ah! Chloris, could I now but sit
> As unconcerned as when
> Your infant beauty could beget
> Nor happiness nor pain,' &c.

His correspondence in relation to Scottish affairs, and especially to the Rebellions of 1715 and 1745, was published in a 4to. volume at London in 1815, under the title of 'Culloden Papers, &c., from the originals in the possession of Duncan George Forbes of Culloden, Esq.' The above facts are stated on the authority of a 'Memoir' of considerable length which is prefixed to this publication.

FORBES, JAMES, a civil servant of the East India Company, creditably known as the author of 'Oriental Memoirs, selected and abridged from a series of familiar letters, written during seventeen years' residence in India,' &c., 4 vols. 4to. 1813. This work includes observations on those parts of Africa and America at which the author touched in his several voyages. The beauty of its decorations, more especially the coloured plates of animals and plants, from drawings made by the author, which have rarely been surpassed in spirit and beauty, obtained for it uncommon popularity. The text also, though bulky, was calculated to interest the public at large, as containing, intermixed with personal anecdote, an amusing mass of miscellaneous information concerning the Company's service, the history, manners, zoology, and antiquities of Hindustan, especially Guzerat, and other provinces on the western coast. The letters and drawings from which these memoirs were taken, are stated to occupy 52,000 folio pages, in 150 volumes. They appear to have been the production of a mind prone to the marvellous, but active, intelligent, and benevolent.

Mr. Forbes was born in London in 1749. It is erroneously said in the French 'Biog. des Contemporains,' that he left England to gratify his love of travel, a statement contradicted by almost every chapter of his book. He went out in 1765, with a writer's appointment, to Bombay; accompanied, in a civil capacity, the troops sent to assist Ragonath Row, peshwa of the Mahrattas, in 1775; and, after a short visit to England for his health, received an appointment at Baroche, in Guzerat, from which he was promoted in 1780 to be collector and chief resident of the town and district of Dhuboy in the same province, then newly occupied by the Company. On the cession of that province to the Mahrattas, in 1783, he returned to England, honoured by the affection and sincere regret of the natives who had been placed under his charge. Being in France in 1803, he was among the numerous *détenus* confined at Verdun, but was released, with his family, in 1804, as a man of science, by the mediation of the French Institute, at the instance of our Royal Society. In 1806 Mr. Forbes published two volumes of letters, descriptive of his tour in Holland, Belgium, and France, with a more particular account of Verdun, and the treatment of the British detained there. He died August 1, 1819. He was a fellow of the Royal and Antiquarian Societies, and the Arcadian Society of Rome. (*Oriental Memoirs.*)

FORBIN, CLAUDE, one of the most distinguished naval officers that France has ever produced, was born in Provence in 1656, and died in 1734. It is unnecessary to enumerate his various exploits against the English, Dutch, Venetians, and the Barbary powers, but we cannot omit a remarkable circumstance in his life, of which he has left an account in his memoirs. We allude to the attempt which was made in the 17th century to introduce European civilization into the kingdom of Siam. It originated with an adventurer, a native of the Ionian Islands, called Constance Faulcon, who came at an early age to England, and entered the service of the East India Company. After many vicissitudes he reached Siam, and entering the service of the king of that country, he succeeded in gaining the favour not only of the prime minister but even of the king himself, who on the death of the minister wished to appoint Constance in his place. He had the good sense however to decline the title, in order to avoid exciting the jealousy of the natives, and contented himself with the exercise of the power. The beginning of Constance's administration was successful, and notwithstanding many difficulties, the country began to improve under the administration of this able foreigner. He now conceived the plan of introducing, with the assistance of the Jesuits, the Christian religion, not only into Siam, but also into the adjacent countries, and with that view he persuaded the king of Siam to send three deputies to Louis XIV. The three deputies died on their way, but Louis having heard of the circumstance sent the chevalier Chaumont, accompanied by Forbin, to the Siamese monarch. The embassy was accompanied by some troops. It concluded a treaty of commerce, secured protection to the Catholic religion in Siam, and returned to France with an embassy from the king. Constance having prevailed on his master to take some French officers and troops into his service, Forbin was appointed grand-admiral of the fleet, general-in-chief of the army of Siam, and governor of Bang-kok. The French troops were stationed in several parts of the kingdom; they occupied the fortresses of Mergui and Bang-kok, and the king requested Louis XIV., by the Jesuit Tachard, to increase their number. Everything seemed now favourable to the progress of European civilization in Siam, and there were great hopes of converting the monarch to the Christian religion, when jealousy between Constance and the commander of the French troops destroyed all these brilliant prospects. A Siamese grandee called Pitracha, taking advantage of the quarrels which divided the Europeans, united all their enemies and revolted against the king, took him prisoner and declared himself regent of the kingdom. He compelled the French to quit the country, and put Constance as well as many other Christians to death. Forbin returned to Europe after a two years' residence in Siam, of which he seems to have been heartily

tired. Forbin's memoirs were published, during his lifetime, in 1730, at Amsterdam, 2 vols. in 12mo. They are written with great ease, and his lively descriptions as well as the variety of events related make them exceedingly interesting. Forbin was distinguished for his disinterested conduct, and for the zeal which he showed on many occasions in procuring merit its just reward. The last years of his life were spent in retirement and devoted to religious exercises and works of charity.

FORCE, a mechanical term, which, though it be sufficiently understood in its common and popular meaning, requires some consideration before its strict and philosophical sense can be understood.

The term force always implies the existence of some cause which produces a visible mechanical effect. Thus the cause of motion and the cause of pressure are both forces: again, difference of effects must be attributed to difference in the producing causes: thus, greater or less velocity, and greater or less pressure, are both attributed to differences in the causes of velocity or pressure. But on the other hand, effects which are the same in one point of view may differ in another; thus, bodies of different weights, let fall from the same heights above the ground, will strike the ground with the same velocities, but with different degrees of effect upon the substance which they strike. Again, if a ball be thrown upwards with a velocity a, which carries it to a height b, it will, when thrown upwards with twice the velocity, ascend through four times the height b. Here, then, considered with respect to one effect, the second force should seem twice the first: considered with respect to another, the second seems four times the first. Such difference of appearance in the numerical quantities of different effects led at one time to long and warm disputes on the *proper* method of measuring force, all of which a clearer knowledge of mechanics has shown to be of very little use. One distinct meaning, with care not to assume the consequences of any other meaning as necessarily deducible from the first, will enable the mechanical reasoner to establish the whole doctrine of statics, or equilibrium: another, the whole doctrine of dynamics, or motion.

It should seem that these two (so called) *forces* should have different names; but custom has settled otherwise. We proceed to the definitions of force.

In the theory of equilibrium, force is a synonyme of pressure, and weight is its measure. The notion of force is here derived, most probably, from the sensation which accompanies muscular effort. Wherever pressure is produced we can find a weight which will supply the place of the pressure: thus, if a string of Indian rubber, hanging from a fixed point, be extended by the hand placed at its lower extremity until its length is doubled, we can, by suspending a weight at the lower end, find what the weight must be in order to produce the same effect. And we then say that the force which the hand exerts is the same as that of the weight. The immediate causes of the effect are very different: our own power of volition, and the connexion between the earth and the weight which it draws towards it are (we may safely say, with all our ignorance of causes) extremely different things; but where they produce the same effect, we cease to think of the difference, and say that they both create the same *force* or *pressure*.

In the preceding definition of force, time is not one of the elements. But we very soon observe that wherever pressure is produced motion is prevented. Let the elastic string be suddenly cut in two, and the hand or the weight immediately descends. It is also proved that matter is incapable of producing either rest or motion in itself: if a certain rate of motion be communicated to it, it will preserve that motion unaltered till some external cause interferes. On this axiom the notion of force, as causing motion, depends for precision: the *alteration of velocity* is the evidence of the existence of force.

When force, in the sense of pressure, is considered as the cause of motion, or rather of change of motion, we must take into account both the necessity of introducing the element *time*, and also the quantity of matter which is moved. No change of velocity can be instantaneously produced: if a billiard-ball, moving ten feet per second, be struck so as to accelerate its motion to twenty feet per second, the accession of velocity is made gradually though rapidly. A stone which has fallen for one second in a vacuum is, at the end of the second, moving at the rate of 32 feet per second: let x be any number or fraction less than 32, and there must be a moment, during the course of the second, at which the stone's velocity is x feet per second. Again, when pressure produces motion, the velocity generated in a given time is less, the greater the quantity of matter to be moved. Let different weights, the first double that of the second, be placed on a table (friction not being supposed to exist) and let given equal weights (say each one ounce) be attached to them by strings and hang over the side of the table: then, supposing the two first weights to be 16 and 8 ounces, the pressures are in both cases the same, namely, the weight of one ounce; but the masses of matter moved are 17 and 9 ounces (for in both cases the moving ounce is part of the whole quantity moved). The velocities at the end of any given time are found to be *inversely* as 17 and 9: so that by the time a velocity of 9 feet per second is created in the mass of 17 ounces, 17 feet per second is created in that of 9 ounces. The connexion of pressure, velocity created by pressure, and time which pressure takes to create velocity, as deduced from experiment, is contained in the following results:—

1. The same pressure continually acting upon a given mass for different times produces velocities which are proportional to the times, and augments velocity by equal portions in equal times.

2. The same pressure applied to different masses of matter (that is, to different weights of matter) during the same time, produces velocities which are inversely proportional to those masses.

3. The velocity of falling bodies is accelerated by 32·19 feet in every second: and in that proportion for all other times.

If then a pressure which is the same as that of a weight V produces motion in a mass of matter whose weight is W, during t seconds, then because the weight of V acting upon the mass of V for that time would produce $32 \cdot 19 \times t$ feet of velocity, we have

Velocity produced by V acting on V (or $32 \cdot 19 \times t$),
is to velocity produced by V acting on W (which is to be found),
inversely as V to W, or as W to V· whence

$$\text{velocity acquired is } \frac{V}{W} \times 32 \cdot 19\, t \text{ feet per second.}$$

If it were required to reduce the weight W, having a velocity v, to a state of rest in a given time, say t seconds, and if P were the pressure requisite to be applied to W during the t seconds to produce this effect, we must remember that the velocity destroyed by a pressure in any direction is the same as would have been created in the same time in the opposite direction, if the mass in question had been already at rest. Thus

$$\frac{P}{W} \times 32 \cdot 19 \times t \text{ must be} = v \text{ or } P = \frac{W\,v}{32 \cdot 19\, t}$$

Hence, in different masses, the pressures necessary to destroy the motions in the same given time are as the products of the masses and velocities. Thus,

The pressure which will in one-hundredth of a second reduce to rest a mass of 10 ounces moving 100 feet per second, is to the pressure which will (also in one-hundredth of a second) reduce to rest 20 ounces moving 85 feet per second, as 10×100 to 20×85, or as 1000 to 1700. It is customary to call this product of mass and velocity the *momentum* or *moving force* of the body. [MOMENTUM.]

When bodies are in motion, and with a continually varying velocity, it becomes desirable to consider their motion, not at all with reference to the masses which are moved, and solely with reference to the alterations of velocity which are produced. Thus if a feather and a cannon-ball move together in the same way, the force that is exerted upon the feather is the same in motive effect (upon the feather) as that which acts on the ball (upon the ball). It is customary to ascertain the amount of velocity which would be produced in one second if the acceleration, such as it is at the point in question, continued uniformly. [ACCELERATION.] And this result is called the *accelerating force*: for which the simple term *acceleration* might be advantageously substituted. It is found by the rules of the Differential Calculus in the following manner (for the demonstration, see VELOCITY). If a point move in a line in such a manner that x feet is its distance from a given point in the line at the end of the time t seconds, and if x be a function of t, then the velocity of the body (v) at the end of the time t is

$\frac{dx}{dt}$ feet per second, and the acceleration which that velocity is then undergoing is such as, if allowed to continue uniformly for one second would increase the velocity by $\frac{dv}{dt}$ or $\frac{d^2x}{dt^2}$ feet. Thus, if $x = t^2 + t^3$, or if a point move through $t^2 + t^3$ feet in t seconds, the velocity at the end of that time is $2t + 3t^2$ feet per second, and its acceleration is $2 + 6t$; or (for instance) at the end of 10 seconds the velocity (320 feet per second) is undergoing acceleration at a rate which would, if continued undisturbed for one second, add 62 feet in that second: or at the end of the *eleventh* second, the velocity would be 382 feet per second.

If f be this accelerating force, we have then

$$v = \frac{dx}{dt}; \quad f = \frac{dv}{dt} = \frac{d^2x}{dt^2}; \quad v\,dv = f\,dx.$$

These are called the *equations of motion*.

Any unit of time might be chosen instead of one second, but not without the following caution. Let g be the velocity generated by a force acting uniformly for one second: then 60 g is the velocity produced in 60 seconds or in one minute. If then we measure the acceleration by g, when the unit is one second, it might seem that we should use 60 g instead of g, when the unit is one minute. But it must be remembered that when we use the minute as a unit of time, we must measure velocities by the spaces which would be described in one minute. Now, in the preceding, 60 g means that the body, at the end of one minute, is moving at the rate of 60 g *per second*; that is, at the rate of $60 \times 60 \times g$ per minute. Hence 3600 g is the measure of the acceleration, when both velocity and acceleration are referred to the minute instead of the second.

Referring to what precedes, we see that accelerating forces (or accelerations) are proportional inversely to the masses in which they are produced, and directly to the pressures which produce them. Thus the pressure V acting on the weight W, produces $\frac{V}{W} \times 32 \cdot 19$ feet of velocity in every second.

The greatest difficulty in the way of the beginner is his liability to confound an increase of velocity with an increase of length described. He should carefully attend to the article ACCELERATION, by which he will see that a *velocity uniformly increasing* causes unequal spaces to be described in equal successive portions of time; while a *uniformly increasing length described* means a uniform velocity, or a velocity which does not change at all.

FORCES, IMPRESSED AND EFFECTIVE. When various pressures act at different points of a system the forces which act upon any one point are not those which would by themselves produce the motion which that point really has, in consequence of the motion of the system. Thus, suppose a pendulum with two balls, one above and the other (which suppose much heavier) below the point of suspension. The forces which act on the upper ball would, if it were free of the larger one, cause it to descend; while, in consequence of the connexion of the two balls, the smaller actually does vibrate like a pendulum turned upside down, or as if its gravitating tendency were upwards instead of downwards. Here is an instance in which the impressed force acts downwards and the *effective* force upwards: that is, the motion which actually ensues is such as would require a force acting upwards to cause it.

One of the most important principles in dynamics is that known by the name of D'Alembert, and is enunciated thus: the impressed forces are altogether equivalent to the effective forces, or if the directions of the latter were all changed, the former would equilibrate them. Suppose an infinitely small portion of time to elapse, during which the different small masses into which the system may be divided receive certain infinitely small accelerations or retardations. From these the effective forces may be deduced, for they are the forces which would severally produce the actual changes of velocity which take place. If then, forces equal and contrary to the effective forces thus deduced were applied at each point, all the motion created by the impressed forces would be destroyed; that is, the effective forces are such as would (applied in contrary directions) prevent the impressed forces from producing any motion. This proof might be put into more accurate language, but it is in substance the one which is usually given. [VIRTUAL VELOCITIES.]

FORCES, PARALLELOGRAM OF. Any two forces acting at the same point, and represented in magnitude and direction by two straight lines, are equivalent to a third force which is represented in magnitude and direction by the diagonal of the parallelogram constructed with the two lines as its sides. [COMPOSITION.] This theorem is frequently called that of the *parallelogram of forces*.

FORCING, in horticulture, is the art of hastening the growth and maturity of flowers, fruits, and vegetables by artificial means.

Many of our finest exotic fruits are indigenous to warmer countries, and would scarcely ripen even in our warmest seasons; but by this art they are brought to great perfection in cold climates, and by advancing or retarding artificially the growing season of hardy kinds they also can be had in regular succession throughout the greater part of the year.

Although forcing to any extent is but of recent date in this country, yet it appears to have been practised in other countries at a very early period of time. Sir Joseph Banks, in the 'Hort. Trans.,' cites some epigrams from Martial, to show that hothouses were not unknown to the Romans, and arrives at the conclusion that in all probability they had both vineries and peach-houses, formed of *talc* instead of glass, which is now commonly used. Pliny tells us that Tiberius, who was fond of cucumbers, had them in his garden throughout the year by means of (*specularia*) stoves, where they were grown in boxes, wheeled out in fine weather, and replaced in the night or in cold weather (Plin. *Hist. Nat.*, xix. 23); whence it may be inferred that forcing houses were not unknown to the Romans, though they do not appear to have been in general use. This branch of horticulture was almost unknown in Britain until the end of the 17th or beginning of the 18th century, and Lady Mary Wortley Montagu, on her journey to Constantinople in the year 1716, remarks the circumstance of pineapples being served up in the dessert at the electoral table at Hanover, as a thing she had never before seen or heard of. Sir Joseph Banks justly remarks, had pines been then grown in England, her ladyship, who moved in the highest circles, could not have been ignorant of the fact. It is said that the discovery of peach-forcing in Holland arose from an old Dutch gardener having, in a bad season when his peaches would not ripen, accidentally placed the sashes of a hotbed over them, which had the effect of ripening them. Even after forcing was practised to a considerable extent, its principles were so little understood, that fruit procured in this way was nearly destitute of that natural flavour which it acquires when exposed to the genial influence of the sun's rays in their most powerful state.

The fruits of warmer climates, growing in a wild state, enjoy a greater degree of light than it is possible to give them in this country at any season of the year, and this is one of the most important circumstances to attend to in the art of forcing. Nature is in all respects the best guide in these matters, and care should be taken to imitate her as far as possible; first, by taking care that forced plants are exposed to all the light that can be collected; and, secondly, by preserving a due proportion between the quantity of heat and light to which forced plants are exposed; in other words, by not forcing too hard at a season when the sun's rays are least powerful, thus acting in direct opposition to the laws of nature. Attention to this is the corner-stone of the whole process. When early crops are more desirable than high-flavoured fruit, gardeners are obliged to apply heat without reference to the intensity of light; but if this is not the object, forcing should never be commenced before the spring, in order that the fruit may have the greatest degree of light when ripening. These principles are now generally understood and appreciated, and consequently our peaches, grapes, and other forced fruits are even superior to those grown under the clear skies of the south of Europe.

Mr. Knight, the president of the London Horticultural Society, recommends the temperature to be kept much lower during night than is generally done, and remarks, 'A gardener in forcing generally treats his plants as he would wish to be treated himself, and, consequently, although the aggregate temperature of his house be nearly what it ought to be, its temperature during the night relatively to that of the day is almost always too high.' In one

of his vineries he always wishes the temperature in the middle of a bright day in summer to rise to 90°, and when the leaves of his plants are quite dry, he does not object to ten or fifteen degrees higher. But he most justly adds, that if this is accompanied by a high temperature at night, 'it exhausts the excitability of the tree much more rapidly than it promotes its growth or accelerates the maturity of the fruit, which is in consequence ill supplied with nutriment at the period of its ripening, when most nutriment is probably wanted.'

The same experienced author recommends the plants for forcing to be rendered, by previous treatment, as excitable as possible, which may be done by ripening the wood early in autumn, and putting the tree into a state of repose, ready to be roused into action by the application of heat.

It appears to be a general rule that plants from warm countries endure with impunity a very high degree of temperature, while those of more temperate regions are impatient of artificial heat, and hence the difficulty of forcing the plants of northern climates; for example, the same degree of heat in which vines flourish would be much too high for cherries, which throw off their blossoms after expansion without setting their fruit. The reason of this seems to be the following: each plant is adapted to the peculiar circumstances in which it is naturally placed; the natives of warm climates are formed to endure heat, and those of higher latitudes to suffer cold; and when these circumstances are reversed, those of cold countries being placed in excessive heat, and those of warm regions in unusual cold, the former are excited by far too much and too rapidly, so that flowers and fruit are developed before the leaves have had time to organize matter to support them; and the latter, if they endure the cold, are not excited, and remain in a languishing unhealthy state. These reasons will at once show the extreme caution which is necessary in forcing the fruits of northern climates, and will at the same time suggest the treatment that plants of such a description require, and which both reason and experience agree in recommending to those who would be at all successful in the art. Firstly, the increase of temperature must be slow and gradual, and never at its highest point exceed 60° or 65° of Fahrenheit with artificial heat; air must be freely introduced, particularly in fine bright weather, and the house so constructed as to admit of the greatest possible quantity of light, as, for instance, having moveable lights which can be taken off and put on at pleasure.

The Dutch have long been celebrated as excellent forcing gardeners, and as their manner of performing the operation is peculiar, a description of it may be interesting. The principal feature in their system is conducting the operation chiefly in frames and pits heated with fermenting dung. The trees employed in forcing are generally taken from a wall in the open air, planted in a rich border of leaf mould, and trained to a trellis a few inches below the glass; here they remain until they have ripened their fruit, after which they are moved back to the wall until wanted for the same purpose in some succeeding year; they never force from the same plant two years in succession. Their system of employing dung instead of fire heat gives them an excellent opportunity of forcing vegetables, such as French beans, endive, lettuce, &c., which are either placed on, or plunged in, the bed in the inside of the frame.

Although pit and frame forcing is a principal feature in the horticulture of Holland, yet they have now, as well as in this country, more elevated structures.

The Dutch plan of forcing is now practised to a considerable extent in a number of gardens in Britain, particularly in that of P. C. Labouchere, Esq., Hylands, near Chelmsford, of which a full account is given in the first vol. of the *Gardener's Magazine*, and another interesting paper upon the same subject, communicated to the Horticultural Society by M. Lindegaard, is published in their Transactions, Series I. vol. v. The best information regarding the scientific principles of forcing is contained in the numerous papers scattered through the Transactions of the London Horticultural Society, and communicated by Mr. Knight and other scientific individuals. The best practical works upon the subject are those from the pens of Speechly, M'Phail, and Abercromby, the contents of which are chiefly given in Loudon's *Encyclopædia of Gardening*.

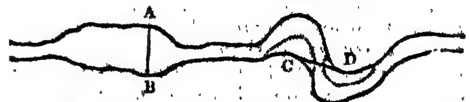
FORD. A name applied to that part of a river where the water is sufficiently shallow to admit of wading through it, and thus crossing over without having recourse to a bridge, a ferry, or other similar means of passage.

Some rivers are never fordable, others are always so; in some the fords are temporary as to season though permanent as to place, and in others they frequently change their situation. Rivers whose banks are steep and course straight are rarely fordable, for in such the water is generally too deep or too rapid to admit of fording. Small and regular streams issuing from springs in flat countries are generally fordable at all times and in all parts. The most common cases however are those of temporary and changeable fords. Of the first of these it is observable that when a river has once formed its bed in a soil of a certain degree of tenacity it seldom changes its channel, so that its shallows and deep parts remain constant, and, if the former permit of being forded, nothing but a rise of the waters renders the ford impracticable. This rise depends entirely on the rains which fall into the basin of which the river is the drain and the size of the basin itself, to which two circumstances the river is generally proportionate. If the basin be large and subject to frequent rain the fords will frequently be rendered impassable; if the rains are of long duration, the passage of the ford will be interrupted for a time proportionably long. The channel however remaining permanent the ford may again be passed as soon as the excess of water has flowed off. Such fords have generally been used long before bridges were constructed, and as travellers from a distance sometimes found the ford impassable on arriving, hostelries for their temporary reception were constructed on the banks. Such has been the beginning of many towns whose names still commemorate their origin, as Chelmsford, Bedford, Oxford, Stratford, &c.

Such rivers as flow through a loose soil, as sand or gravel, have generally a very winding course and are constantly shifting their channel, that is, the deep part (which the Germans call the *thalweg*) of their bed. These rivers though they present the greatest number of fords are constantly varying the situation of them, so that they are not only temporary as to season but also as to place. The rains by increasing the mass of water increase the strength and rapidity of the current, by which the bed is ploughed up and deepened in an irregular manner. Banks also are carried away and others formed in parts that before were deep. Thus after every flood the place of the ford is changed.

In the case of torrent rivers, such as those of Italy, fords are very common, but they are subject to be rendered suddenly impassable, or shifted, the waters rising with frightful rapidity to a great height and acquiring amazing force. They however soon subside, and, unless they have deepened the channel, cause no other inconvenience than a very temporary delay.

In military operations fords are of the greatest importance. The inhabitants on the borders of a river generally know where they are, but as their indications cannot always be relied upon, particularly in an enemy's country, the fords must be looked for. They are generally found either in the widest part of the river, or in the direction of the diagonal line that joins the salient angle of one side to the salient angle of the other side, as A B or C D.



In the first case the waters spread out in the wider part of the bed of the river, and are therefore less deep; and in the second, there is always a deposit in front of the salient angles (as indicated by the dotted lines) and consequently the water is more shallow in those parts.

Fords for infantry should not exceed the depths of three feet, and for cavalry that of four feet. These are the extreme depths, and if the current be somewhat rapid it is dangerous to risk fording through more than two feet water for infantry and three for cavalry. The bottom must also be firm and even. Mud, weeds, or blocks of stone are great obstacles—loose sand is also bad as a ford for cavalry, for, being stirred up from the bottom by the horses it is carried away by the stream, and the ford thus becomes so deep that the last horses, in such case, are frequently forced to swim. The opposite bank must also be easily accessible and clear, for it is useless to cross a river when, on gaining the opposite side, your further progress is impeded by rocks

or impassable forests, thick brushwood, or swampy ground. Having discovered a ford, it is indispensable to mark its situation, and if some time should have elapsed previous to conducting the troops to it, the ford should be again examined in order to be sure that the waters have not risen, or that the enemy may not since have rendered it impassable, which may be effected in different ways. Other considerations are necessary when the ford is to be passed in presence of an enemy, but these belong to a different subject.

FORD, JOHN, the dramatist, descended from a highly-respectable family in the north-west of Devonshire, was the second son of Thomas Ford of Ilsington in that county. The exact date of his birth is not known, but Malone's industry has fixed his baptism at April 17, 1586, as appears from the parish register of Ilsington.

Having some connexion with Popham, the chief justice, Ford was designed for the bar, and entered at the Middle Temple, November 16, 1602; four years after which time he produced his first poem, 'Fame's Memorial,' an elegy on the death of the earl of Devonshire, dedicated to his countess, the beautiful sister of the favourite earl of Essex. This poem adds nothing to the author's present reputation, and all we gather from it are some hints of a disappointment in love, for the cure of which he had recourse to writing.

In addition to this mode of mental relief, he applied himself to a practice then common, that of assisting in the composition of plays, but he did not appear as an independent writer till 1629, when he published 'The Lover's Melancholy,' which was followed four years afterwards by ''Tis Pity She's a Whore,' 'The Broken Heart,' and 'Love's Sacrifice.' The next year produced 'Perkin Warbeck;' and in 1638-39 he published two serious comedies, called 'The Fancies chaste and noble,' and 'The Lady's Trial.' Besides these, he wrote in conjunction with Decker 'The Sun's Darling,' a moral mask, which was not printed till 1657 according to Langbaine, or 1658 according to Gifford.

Nothing more is known of Ford: but from some obscure traditions it has been supposed that soon after 1638 he retired to his native place of Ilsington, and there spent the remainder of his days.

Ford's plays contain many fine thoughts, and numerous specimens of harmonious versification, apparently the result of considerable labour. One fault into which he has fallen in common with others his contemporaries, that namely of killing off all his *dramatis personæ* at the end of the fifth act, appears to arise from an overstrained desire of completing and perfecting the action of the play. Forgetting that the end of every drama is to represent a certain crisis in the affairs of one or more of the principal agents, he endeavours to make the fortunes of almost all the inferiors converge to the same point, and accordingly involves them in a similar ruin. This is very much the case in ''Tis Pity She's a Whore' and 'The Broken Heart;' in the latter, as much from the intricacy of the plot as from any other reason.

His best work is, we think, 'Perkin Warbeck.' It has an air of repose throughout which we do not see in Ford's other plays. The device too of making Perkin believe in the justice of his own claims is highly ingenious; besides which the characters of Huntly, Katharine, and Dalyell are so excellent, that the whole effect of the play is very much like what is called Shakspeare's second manner. Here however, as in all Ford's dramas, we want Shakspeare's clowns and fools. There is nothing of nature, or even of genial humour in Ford's comic characters: the best is perhaps the tailor in 'Perkin Warbeck,' but he is, to speak in the most favourable terms of him, very much overstrained. It is in melancholy passages and love scenes that we must look for Ford's peculiar excellence; and if the characters of Annabella and Giovanni had been more fully sustained throughout, ''Tis Pity She's a Whore' would probably have been Ford's most perfect tragedy.

(Langbaine's *Dramatic Poets*, p. 219; Winstanley's *Engl. Poets*, p. 114; Gifford's edition of Ford.)

FORDUN, JOHN DE, the father of Scottish history, is believed to have been a canon of Aberdeen, and to have been born in the parish of Fordun, in the Mearns, in the early part of the fourteenth century. He probably died in the year 1386, or very soon after. His history, as far as completed by himself, is in five books, and comes down to the end of the reign of David I. (A.D. 1153); it begins at the creation, the first chapter being entitled 'De Mundo sensibili, terra scilicet et suis quatuor punctis principalibus, orientali, occidentali, australi, et boreali,' and a great deal that immediately follows, being rather a treatise on cosmogony than a chronicle or history. But, in addition to the five books, he left materials for bringing down the narrative to A.D. 1385, which were put in order by Walter Bower, abbot of Inchcolm, who, as he tells us himself, was born in that year. Bower also continued the history to the death of James I. (A.D. 1437), the whole work being thus extended to 16 books. Fordun states that he spent much time in collecting the materials for his history, both by inquiry and by travel; and he appears to have made a diligent use of all the sources of information that were accessible to him. He has undoubtedly preserved many facts which otherwise would have perished. Although by no means free from the credulity which belonged to the spirit of his age, he deserves to be considered as, by comparison, both an honest and a sensible writer; the mythology of the Scottish history appears in a much simpler shape in his account than it assumes in the hands of his successors. The five first books of Fordun's work were first printed under the title of 'Joannis Fordun Scoti Chronicon, sive Scotorum Historia,' in Gale's 'Historiæ Britannicæ, Saxonicæ, &c. Scriptores xv.' (commonly referred to as the first volume of Gale's collection) fol., Oxon., 1691, pp. 563-701. The first complete edition of the work was published by Hearne, at Oxford, in 5 vols. 8vo., in 1722, under the title of 'Joannis de Fordun, Scotichronicon.' A more complete and accurate edition appeared at Edinburgh in 1759, in 2 vols. fol., entitled 'Joannis Fordun Scotichronicon, cum supplementis et continuatione Walteri Boweri, Insulæ Sancti Columbæ Abbatis, &c., cura Gualteri Goodall.' Some copies of this publication are said to have a different title page, with the date 1775. Of Goodall's performance Pinkerton (*Introduction to Inquiry into History of Scotland*) says: 'A laudable work; but his introduction is another violent piece, fraught with contemptible scurrility, low prejudice, small reading, and gross error. He talks like a master where he is not even a scholar, and dreams he knows everything where he knows nothing.' Many manuscripts of Fordun are extant. In all of these, we believe, the 'Scoti' of the title is joined in one word with the 'Chronicon,' and not placed separately as an annexation to the author's name, in the manner in which it is printed by Gale.

FORDWICH. [KENT.]

FORECLOSURE. [MORTGAGE.]

FORELAND, N. and S. [KENT.]

FOREMAN. [JURY.]

FORESHORTENING (in Italian *scorciare*, *scorcio*) is a term chiefly applied to anatomical drawing when one or more limbs of a figure, or its entire body, are shown so as to be *shortened* by being viewed directly in front or nearly so, and the spectator seeing little more than its *fore* end, or that which is towards him. Thus, supposing an extended arm and hand to be nearly opposite the eye, and perpendicular to or forming a right angle with the picture, little more than the tips of the fingers and thickness of the arm would be visible. Hence, as perspective has been defined to be the art of foreshortening objects, foreshortening may be explained as linear perspective applied to the human figure, this being the principal case which admits of striking perspective effect in such subjects; because when, as for the most part happens, the limbs are beheld in their full or nearly their full extent, let the attitude be what it may, the outline is little affected by mere perspective; consequently, except in ceiling-pieces, where the figures are supposed to be above the spectator, and seen from below the plane on which they stand, foreshortening—at least any considerable degree of it—is rarely required in delineating the human figure; while, on the other hand, it occurs more or less in almost all those of animals, their forms being more compounded and their bodies placed horizontally. An example of *foreshortening* may therefore at any time be obtained by standing either in front of or behind a horse, when the hind or fore-legs, as the case may be, will be nearly concealed by those towards the eye, and the back of the animal or its length be no longer visible. In sculpture, unless it be in reliefs, the foreshortening of the limbs depends entirely upon the station chosen by the spectator himself; whereas in painting it depends upon that chosen by the painter for him; and several fine examples of it occur in the works of Michael Angelo, Correggio, and Rubens.

FOREST, an extensive tract of ground overgrown with trees alone, of one or several species, or with trees and underwood.

Forests are not only highly interesting in themselves, but are of most extensive importance, whether as regards their influence in the general economy of the globe or on local climate; as supplying to man those necessary articles timber and fuel, besides a variety of nutritious, medicinal, and tinctorial plants; or finally, as affording shelter to wild animals, which finding in them both food and security, leave man unmolested.

In taking a view of the forests which cover such immense tracts of the earth's surface, the first thing which strikes us is their variety. In one place they are composed of palms, in another of oaks, and elsewhere of pines and birch trees, &c. We are next surprised at the apparent dissimilarity of situation in which we find collected together trees of the same kind; palms in America, in Africa, and in Asia; oaks and pines in Russia and in Mexico, in plains and on mountain tops. A little consideration however will satisfactorily account for this. Trees, like other vegetables, require, according to their several natures, and independent of suitable soils, different modifications of heat, light, moisture, and atmospheric pressure; circumstances which, so far from being influenced by latitude alone, are much more dependent upon height above the level of the sea, its vicinity and other circumstances, than upon proximity to or distance from the equator. Hence, not only do we find particular kinds of trees associated in those regions which are most conducive to their perfect development, but as we find regions of similar climate in different parts of the world, so do we find them producing vegetation of similar character, and thus, though the torrid zone has forests peculiar to itself, we there find also, but at different heights above the sea, the forests of what are termed the temperate and frigid zones. It is however remarkable and not easily accounted for, that, although the same trees seem to require similar climates, these climates do not always give birth to the same kind of plants. The climate of many parts of the mountainous region of the torrid zone is similar to that of the temperate zone, and yet Humboldt did not find a single indigenous rose-tree in all South America, and this shrub is entirely wanting in the southern hemisphere. Heath is peculiar to the old world, for out of 137 known species, not one is found in the new continent from Pennsylvania and Labrador to Nootka and Alashka; and the greater part of our European forest-trees, even the hardiest, disappear towards the Tobol and the Irtish. They do not grow in Siberia though the climate is the same. The oak, the hazle, and the wild-apple are not found from the Tobol to Da-uria, although the two first appear again suddenly on the borders of the Argoun and the Amur, and the last is again found in the Aleutian islands.

According to Humboldt, whether we ascend from the plain of Oratavia to the top of the Peak of Teneriffe, or from the shores of the Pacific to the summit of the Mexican Andes, we find different zones of vegetation, in which the succession of forest-trees follows, generally, the same order that is observed in passing over the surface of the earth from the equator towards the poles. Raymond, also, in the Pyrenees, and Tournefort, on Mount Ararat, found in ascending these mountains, the same succession of trees as exists in passing from their particular latitudes towards the frozen regions. From this fact it has been rather rashly concluded, that certain heights correspond in the nature of their vegetation with certain latitudes: this however is not strictly the case, nor is the succession we have mentioned absolutely that observed in proceeding from the equator northward. The extreme heights at which certain forest-trees vegetate in the Andes are different from those at which the same trees are found in the Pyrenees, and while the birch is nearest the snow in Lapland it is succeeded in the Alps by the pine. These anomalies are explained by a difference in some of the elements of local climate, and by the probable fact of particular primitive distribution. It is also remarkable that in some cases forests are composed solely of some particular tree. Thus, in Lapland there are extensive forests of birch without a single tree of any other kind, and without underwood. In Mazovia also are extensive forests of nothing but birch. In Norway, Sweden, and Finland many forests consist exclusively of pine. Asia has whole woods of nothing but cocoa-nut, &c.

Our European forests, generally considered, are composed chiefly of oak, elm, ash, beech, alder, poplar, willow, plane, birch, and lime, together with interspersed wild-apple, pear, and cherry-trees, dogwood, hawthorn, and service-tree; the underwood being hazle, elder, buckthorn, viburnum, dog-rose, &c. Yew and holly are the evergreens of our woods, and of coniferous trees we have the larch, different species of the pine and fir, the cypress, and the juniper.

Forests of Great Britain and Ireland.—The British isles, like other countries of Europe, were in former times much more abundantly covered with timber than they are at present. The increase of population tends to the destruction of forests by causing a demand for the productions of arable land; and this, together with the prodigal expenditure of wood, when it is abundant, and the general and long-continued neglect of any measures tending to ensure a constant supply, have been the chief causes of the great diminution of wood. But though we have now hardly any forests of considerable extent, there are perhaps few countries over which timber is more equably distributed, that is, in those counties where the soil and aspect are favourable to its growth. Woods of small extent, coppices, clumps, and clusters of trees are very generally distributed over the face of the country, which, together with the timber scattered in the hedge-rows, constitute a mass of wood of no inconsiderable importance.

In Herefordshire, Warwickshire, Northamptonshire, and Staffordshire is abundance of fine oak and elm woods. In Buckinghamshire there is a quantity of birch and oak, and also fine beech. Sussex, once celebrated for the extent and quality of its oak forests, has yet some good timber: at present its woodlands, including coppice-wood, occupy 175,000 acres. Essex, with 50,000 acres of woodland, has some elms and oaks. Surrey, Hertfordshire, and Derbyshire abound in coppice-woods. In Worcestershire is abundance of oak and elm. In Oxfordshire there are the forests of Whichwood and Stokenchurch, chiefly of beech, with some oak, ash, birch, and aspen. Berkshire contains a part of Windsor forest; and Gloucestershire, the Forest of Dean; so that these three last counties are extensively wooded and with noble trees. Cheshire has few woods of any extent, but the hedge-row timber and coppices are in such abundance as to give the whole country, especially when seen from an elevation, the appearance of a vast forest. Of the remaining counties some have very little wood, and a few are altogether without; but the want and value of timber have given rise to a great many flourishing plantations. In Wales particularly, there is a rage for planting. In South Wales alone six millions of trees, it is said, are annually planted: if that is the case, nine-tenths of the number must come to nothing, or the whole country would be one entire forest.

Scotland has few forests of large timber, if we except the woods of Inverness-shire and Aberdeenshire. In the former of these counties the natural pine-woods exceed the quantity of this wood growing naturally in all the rest of Britain. In Strathspey alone there are 15,000 acres of natural firs; and in other parts the woods are reckoned by miles, not by acres; there are also oak woods and extensive tracts of birch. In Aberdeenshire, in the higher divisions of Mar, there are 100 square miles of wood and plantations. The pines of Braemar are magnificent in size, and are of the finest quality. Argyleshire, Dumbartonshire, and Stirlingshire have many thousands of acres of coppice-wood, and, with a very few exceptions, the remaining counties have many, and some very extensive plantations.

Ireland has every appearance of having been once covered with wood, but at the present day timber is exceedingly scarce in that country, there being no woods, if we except a portion along the sea-coast of Wicklow, the borders of the lake Gilly, in Sligo, some remains of an antient forest in Galway, and some small woods round Lough Lene, in the county of Kerry. The lakes of Westmeath have also some wooded islands. There are extensive plantations in Waterford, and a few natural woods, of small extent, in Cavan and Down; but Fermanagh is the best wooded part of Ireland. The want of wood however in this country, as far as it is employed for fuel, is little felt, in consequence of its extensive bogs, which furnish an almost inexhaustible quantity of peat.

Upon the whole then, though Great Britain and Ireland do not now possess any extensive forests, still there is a considerable quantity of timber, and the extent of new

plantations seems to promise that we shall never be wholly destitute of so essential an article as wood. According to M'Culloch, there is annually cut down in Great Britain and Ireland timber to the amount of 2,000,000*l*.

If from our own country we pass over to the continent of Europe, we shall find forests of much greater extent, particularly in the north-east.

Norway.—In the southern part of this country the mountains are covered with wood; birch, maple, pine, and fir, forming immense forests; the fir, sometimes attaining a height of 160 feet, is in great estimation for masts and building timber: in the regions of moderate elevation are aspens. The good lands have some fine forests of oak, which extend as far as Drontheim, in 63° north latitude. The forests of *Sweden* are similar to those of Norway. In the damp places there grows in abundance the almond-leaved willow (*Salix amygdalina*).

Denmark.—Of this country it may be remarked that Jutland, once covered with thick forests, has now only a few long slips on its eastern side. Holstein has very little wood. The island of Funen has some small woods, as also Sealand, in that part of it which borders on the Sound. Falster is well wooded, and Bornholm has a good deal of birch. In all, Denmark possesses about 130 square leagues of wood, chiefly birch; there is also ash, alder, and oak, but pine and fir are scarce.

Holland possesses timber, though not in very great quantity generally speaking; what there is, consists of beech, fir, poplar, and ash; willow grows along the canals, and the coppices are of maple, ash, hornbeam, birch, and beech, with a slight portion of oak-bushes. In Guelderland there are plantations of many miles in extent of fir and Weymouth pines, and many hundred acres have been sown with acorns. At Rhenen there are thick woods, as also at Arnhem; and many plantations have been formed on the upper Yssel of fir, pine, oak, beech, and birch.

Germany is so well wooded that the forests are estimated to cover about one-third of the whole surface, though some consider this estimate too large. In *Hanover* are some fine groves, and a quantity of limes and willows planted in rows. This kingdom also includes about three-fifths of the Harz forest. In *Westphalia* there are very extensive forests, one in particular, in the neighbourhood of Osnabrück, is about thirty-two miles long and twenty broad. These woods, in which there is abundance of the finest oak timber, are stocked with swine, and furnish the hams so generally esteemed over all Europe. In *Brunswick* the woods and plantations cover a surface of near 300,000 acres. *Saxony* is also abundantly supplied with forests and plantations. *Hesse Cassel* has about a million of acres of wood, and the Rhenish provinces are amply furnished with it. *Prussia* possesses about 18 millions of acres of woodland. Near Kunnersdorff is a wood 20 miles in length. The banks of the Oder are well furnished with fine oaks, as also pines, birches, and willows, of extraordinary dimensions; elms do not thrive. In several places the roads for miles are bordered with poplars, and there is abundance of flourishing plantations. *Bohemia* possesses forests of all the trees common in Germany; they are regularly cut, and furnish upwards of 270 millions of cubical feet of wood, of which, as it greatly exceeds the consumption of the country, a considerable part is exported. *Bavaria* grows a quantity of fine oak and beech timber: the principal forests are those of Spessart, the Rhön-Gebirge, Zwieslar, Mitten, Kulwald, Retzler, Lorentz, &c.; they cover together a surface of upwards of seven millions of acres, being about 29 hundredths of the whole superficies of the country, or nine acres to each family. In *Würtemberg* the forests occupy about one-third of the whole surface. *Baden* counts about two millions of acres of forests, consisting of oak and pine. In the *Archduchy of Austria*, though there are many forests, they have been so long neglected, that wood is comparatively scarce and dear. The *Hungarian states* have, towards the north and west, as also in Transylvania, some very extensive forests; that of Bakony, the most considerable in the country, is full of the finest oaks. The plains are in general bare of wood, but the Carpathians are covered with the dwarf pine (*Pinus pumilio*). The whole country contains about 12 millions of acres of forest. The *Tyrol* abounds in timber, of which a quantity is exported to Venice.

Switzerland is abundantly wooded, particularly with the cone-bearing trees. Oaks are found occupying a region which rises to the height of 2800 feet above the sea, beyond which, and to the height of 4000 feet, there are beech woods; the firs are found at the height of 5500 feet.

France has many fine forests, though hardly sufficient for the consumption of a country where wood is the chief combustible, and where the state of the arts and general civilization create a constant demand for large timber and wood of every kind. The variety of climate and position in that country are however favourable to the growth of all kinds of European and many exotic trees; the oak, the birch, the elm, the ash, and the beech, are abundant; the alder grows in the damp places, and the mountains are clothed with pines and fir. The woods are pretty generally distributed over the country; and of the 86 departments into which the country is divided, there are 24, in each of which there are from one to two hundred thousand acres of wood, a dozen more containing each from two to three hundred thousand acres, six having from three to four hundred thousand acres, and three which reckon each above four hundred thousand acres. The department of Dordogne alone contains upwards of a million acres of wood. In all France there is reckoned about 21 millions of acres of woods and forests; of which about one-seventh, consisting of 1473 different forests, belong to the state.

Italy, the geographical position and local peculiarities of which are favourable in a high degree to vegetation of every kind, is not particularly rich in forest trees. There is at Ravena an extensive forest of the stone pine (*Pinus pinea*). The Apennines also have their portion of coniferous trees, and are in some places covered to the top with luxuriant forests of chestnut-trees. The fertile basin of the Po abounds in plantations of olive, mulberry, fig, and almond-trees, while the pyramidal poplar forms a contrast by its tapering form with the flattened and branchy head of the stone pine, and the same may be said of other parts of Italy. In *Sicily* the forests have long since been exhausted, and wood is extremely rare in that island. But in *Sardinia* one-fifth of the surface is covered with antient forests of oak, among which is the cork oak (*Quercus suber*), the common oak (*Q. robur*), and the evergreen oak (*Q ilex*).

Spain and Portugal are deficient in wood, both as regards quantity and quality. The peninsula however is not unfavourable to the growth of timber; in the time of the Moors, the southern provinces in particular possessed some noble forests, but they have long since been devastated; and although since the time of Philip II. there exists an excellent code of forest laws, they are altogether disregarded or evaded. Nevertheless there are still some forests in Spain; thus between the two Bagnères, in the Spanish valley of Aran, and on both sides of the western Pyrenees, there are forests of the silver fir; and on the south side of these mountains, east of Benasque, as also near Mont Perdu, and on the hills surrounding the republic of Andorra, are woods of the *Pinus uncinata*; and in the neighbourhood of Campo, in Upper Aragon, are forests of the *Pinus pyrenaica*, or, according to some, the *P. Larichio*, or Corsican pine. On the Sierra de Cuença, the Sierra de Segura, the Sierra Nevada, and the Serrania de Ronda, are some tracts of different kinds of pine, as the *P. Hispanica*, or Spanish pine, and the Aleppo pine (*P. halepensis*). The Aleppo pine grows in considerable quantities in Catalonia, and in the western part of Andalusia is a forest of the stone pine. The principal forest of Spain however is that of St. Ildefonso, which is chiefly of the Scotch pine (*P. sylvestris*). In the maritime part of the Basque provinces there is nothing but the miserable *pin des landes*. In Biscay beech only is cultivated; but in Galicia and in Catalonia there are both oak and beech. In Estremadura there are forests of the evergreen oak, which produce the sweet or edible acorn; Catalonia, Valencia, and the environs of Seville, produce the cork-tree (*Q. suber*). This tree, which was formerly abundant in Andalusia, is proceeding rapidly to extinction. Many parts however of the Castiles, Aragon, Andalusia, and Estremadura, are without wood; and although the common oak is found in small quantity in the northern provinces, upon the whole there is a great deficiency of useful wood: all the middle and southern regions hardly produce one good kind of timber.

European Turkey.—Of this country it is observable that, on the northern side of the Balkan, in the basin of the Danube, there are fine forests of oak, elm, and pine, and in Wallachia there are whole forests of fruit trees, particularly plum, apple, pear, cherry, and apricot. On the southern

side of the chain the forests are particularly varied. Different kinds of pine and fir, oak, maple, sycamore, walnut, chestnut, and beech, are found in succession on the several terraces, while on the mountains themselves forests of oak, elm, and lime, abound. The Morea produces the cork tree, the Kermes oak, the Vallona oak, of which the acorns are eaten, the plane, the wild olive, the sweet chestnut, the manna ash, pine, firs, and the larch, the barren date tree, the silk tree, &c., and a variety of plants used in the arts, and in pharmacy.

Russia.—Of all the countries of Europe, Russia is the most abundantly provided with timber; and her forests would be an almost inexhaustible source of wealth, if it were possible for the government effectually to protect them from destruction. In 1802 regulations for the preservation of the forests were established, but such is their extent and that of the country, that it is next to impossible wholly to prevent the waste of wood.

Hermann's Statistical Notice of the Agriculture of Russia, published in the 8th vol. of the 'Memoirs of the Academy of Sciences of St. Petersburg,' and quoted in Mr. Schnitzler's late work, states, 'there are still 200,000,000 of acres exclusively covered with pine and other cone-bearing trees, without counting oaks, maples, beech, poplar, and hornbeam, (none of which are scarce below the latitude of 52°) and birch, which grows further north.' In the year 1804 it was estimated that there existed 8,192,295 pine trees fit for masts, being 30 inches in diameter; and 374,804 oak trees, of 24 inches and upwards in diameter; about 87,000,000 more pines were proper for building timber. Enormous as this may appear, the statement, so far from being exaggerated, would seem to be considerably below the truth, it being certain that in the three northern governments alone of Wologda, Archangel, and Olonetz, there are 216,000,000 of acres of forest trees, chiefly pine and fir. Birch, pines, fir, and limes, are the common forest trees of European Russia. The first is the most abundant as far as the 55th parallel, beyond which there are still found vast forests of pine and fir. The governments of Novgorod and Twer are covered with wood: the Volkonsky forest is the largest in Europe. In the government of Perm, of a surface of 50,000,000 of acres, 47,000,000 are covered with forests. Many of these immense tracts of wood are impenetrable, and harbour great quantities of bears, wolves, and other savage beasts, while others abound in deer and game of all kinds. In Esthonia, Livonia, and Courland, there are fine forests of pine, fir, and birch, the latter predominating in the moist places; alder, ash, elm, and plane, are found in the good soils, but oak is in general scarce. In Courland lime is abundant, but beech is rare; there are willows of several varieties. In general it may be observed that, in Russia, the pine, fir, and other coniferous trees, are found as far north as 67°; birch, aspen, and extensive forests of lime, as far as 54° or 55°; oak, rare in the central plateau, prospers towards 51° or 52°, but in the valley of the Volga they are fine and abundant at 55°. In the same region where the oak succeeds the Russian maple (*Acer tartaricum*) is in abundance, as also white poplar and hornbeam. In the central provinces beech hardly reaches Smolensk, and does not pass beyond Little Russia. In some parts of the Ukraine are fine oak forests. In Lithuania the timber is generally fir, intermixed with pine and birch, and occasionally oak. The woods of the latter province harbour bears, elks, &c., and in the celebrated forest of Bielovieje is found the bison, a species of *Urus*.

Poland, generally speaking, is covered with magnificent forests; in Mazovia particularly there are some very fine woods. The different varieties of the pine are found in the sandy places, and on the mountains are fir and beech. Oak succeeds well in good soil. In addition to these trees Poland also possesses larch, lime, elm, and ash. In the Buckowine are forests of beech, intermixed with fir and birch woods.

It appears then, that although the progress of civilization and increase of population have greatly diminished the forests which at one time covered great part of Europe, there is still an immense quantity of wood, and the necessity of keeping up a constant supply being now very generally acknowledged, there is reason to hope that the forests will no longer be abandoned to wanton destruction, but that, on the contrary, the felling of timber and cutting of copse woods will be properly regulated, and fresh plantations made to replace the wood consumed.

We will now take a hasty glance over other parts of the world.

Asia.—In the Caucasus we find that on the western, eastern, and southern slopes of this chain, there are forests of cedar, cypress, juniper, beech, and oak, and on the edges of these, quinces, wild apple, and pear trees, while the warm and sheltered valleys produce the almond, the peach, and the fig. On the borders of the Caspian there are woods of olive, plane, and laurel.

In *Asia Minor*, Mount Taurus is covered with forests of cypress, juniper, and savines. The gall-nut oak grows from the Bosporus to Syria, and the Persian frontier; oaks and fir abound in the forests along the Black Sea. There are also in different parts woods composed exclusively of fruit trees. Syria, to a vegetation greatly similar, adds the sycamore and palm trees.

Arabia has no forests, properly speaking. The Oases, however, contain groves of date palms, tamarinds, and different fruit trees. In Hejaz the date palm is abundant.

Persia.—In Mekran there are forests of the Indian palm intermixed with the odoriferous shrubs of Arabia Felix. In the valley of Shiraz we find only clumps of plane trees, weeping willows, and poplars; but the mountains which border the Caspian are covered with oak, lime, acacia, and chestnut, and higher up cedar, cypress, and other pines, with the sumach and the mountain-ash. Ghilan abounds in boxwood, and on the south-east of the Caspian there is great abundance of oak, but no pine.

Siberia is too cold for the oak, the hazle, the alder, the plane, and the wild apple; even the ash ceases towards the Irtish; and the fir, which in Norway grows as far as 70°, stops in Siberia at 60°, while the silver fir goes no further than 58°. The great steppes of this country are nevertheless bounded by thick forests of birch, willow, elm, Tartarian maple, black and white poplar, aspen, and a great variety of firs, among others the Siberian cedar, which sometimes attains a height of 120 feet, and is particularly fine on the banks of the Yenesei. The country between this river and the Baikal is well wooded. At Tobolsk are fine woods of birch, and of the pitch pine. Berezoff has also forests of birch and fir, with stunted Siberian cedar. In the government of Tomsk there are forests of elm, larch, willow, and birch; and between the Obi and the Tom, the land is covered with birch. To the west of Irkutsk the country is nothing but one vast dense and swampy forest. At Nertchinsk, in Russian Da-uria, forests abound formed of larch, black and white fir, Siberian cedar, and black birch, which latter is found only here. There are also whole forests of wild apricot and rhododendrons. At Ockhotsk there are immense tracts of swampy forests, and Kamtchatka, the eastern limit of the Old World, abounds in larch, white poplar, and birch. The willow and the alder are employed only for fuel. On the whole, Siberia, notwithstanding its immense steppes and marshy plains, still reckons upwards of 2,000,000 of acres of forest in the two neighbourhoods alone of Ekaterinbourg and Tobolsk.

Central Asia is too little known for us to speak with any certainty regarding the forests it may contain. The greater part of the vast plateau of Tartary is a sandy and desert region, except at the immediate borders of the water courses; what forests do exist are on the slopes of the mountains by which the plains and valleys are surrounded. In the province of Leao Tong, in Mandshuria, there are some extensive forests of fir, cypress, acacia, willow, apricot, peach, and mulberry, and on the east coast the mountains are covered with oak and pine, while towards the lower lands the willow, the maple, and the azalea are abundant.

Corea has immense forests in the mountains of its northern parts. The islands of *Sagaleen Jesso*, and *the Kuriles* have large forests of the finest timber.

The *Empire of Japan* has a vigorous vegetation, partaking of the European and South Asiatic; larch, cypress, and weeping-willow, which, by the way, is found in all the temperate countries between the Mediterranean and this empire, are here blended with the cocoa-nut, the fanpalm, and arborescent mimosas.

China.—On the mountains of the western district of this great and populous empire there are forests of immense extent, abounding in almost every species of tree known in Europe, and many others unknown. These forests, besides timber and fuel, supply many valuable productions, such as barks, gums, oils, and resins used in the arts; rosewood, ebony, sandal-wood, and the valuable Chinese aloe;

the camphor-tree, which furnishes the best and most beautiful timber, the paper and other mulberries, the tallow-tree, the bamboo, &c. The provinces of Kiang-si and Quang-si have also their mountains covered with forests, and in the latter province there is cinnamon superior to that of Ceylon.

The islands of *Formosa* and *Hainan* are abundantly wooded, producing, besides timber, several woods remarkable for their perfume, and others of great value for carving, as eagle-wood, violet-wood, and a yellow wood of remarkable beauty, said to be incorruptible. Returning to the continent of Asia, we find

Tibet, having the bases of its mountains girded with forests of bamboo, aspen, birch, cypress, and yew, and ash of remarkable beauty; pine and fir are low and stunted.

Cashmere has abundance of oak.

India, both within and beyond the Ganges, is rich in wood. There are whole forests of the bamboo, which sometimes attain a height of 60 feet. Cocoa-nut and palms of all kinds cover large tracts. Here are woods of oak, fir, cypress, and poplar; there of mangoes, banian-trees, uvarias, robinias, sandal-wood, &c. Guzerat, Oudepour, the kingdom of Asam, Bengal, along the coast particularly, the mountains of Tipra, and Malabar abound in wood: the latter produces teak. In the Birman empire there are magnificent forests of the last-named valuable tree, together with white sandal-wood, eagle-wood, iron-wood, ebony, sycamore, Indian fig, fanpalms, bignonias, cocoas, and sago-palms; as also fine groves of orange, lime, &c.

The kingdom of Laos, Tonquin, Cambodia, Siam, and the peninsula of Malacca, have a nearly similar vegetation.

Ceylon is also well wooded with Asiatic trees and shrubs: among the former are the ebony and satin-wood, and of the latter the cinnamon is the most remarkable.

Of *Oceanica* it is sufficient to say, that all the islands are more or less abundantly covered with timber; many produce trees of immense size, and of the finest wood, while others furnish the most valuable gums, drugs, and spices.

Australia, as far as known, is not thickly wooded; it produces mahogany, but the forest-timber of this island is said to be brittle, and generally of bad quality.

Borneo is remarkable for the growth and quality of its timber, and the great perfection to which the camphor-tree attains.

Africa. With the exception of the wide-spread deserts and sandy tracts of this part of the world, and in spite of the burning heat of a vertical sun, there are spots which, by reason of their elevation or their proximity to the sea, enjoy a more temperate climate and abundance of moisture; in these places vegetation is rich beyond description. Thus Senegambia, Guinea, and Congo are covered with forests, which consist of the baobab (of which there are different kinds, though only one seems to have been described), of palms, robinias, sycamores, sandal-wood, red and grey, and tamarinds, intermixed with bananas, oranges, limes, and pomegranates; there are also cocoa-nut trees in great abundance. The tamarind and cedar, which grow in the greatest profusion on the borders of the Congo, furnish timber of the finest quality. *Abyssinia* has abundant woods, in which grow the smooth-leaved coral-tree (*Erythrina corallodendron*), the tamarind, the date, some mimosas, and a large timber tree, which Bruce calls *rak;* but the botany of this country is little known. On the coast of Adel there are odoriferous forests, producing the balm of Judæa, myrrh, &c. *Egypt*, though abounding in plantations of fruit-trees and dates, has no forests. The Atlas mountains, on the contrary, are covered with magnificent forests, equal to the finest in Italy, and producing a variety of oaks, the mastic tree, the cypress, &c. In the interior of the Atlas, the environs of Borgou are said to be covered with trees, among which are several kinds of sycamore, palms, and the *mimosa nilotica*. The kingdom of Bornou has immense forests, and the date-palm abounds here. *The Cape*, celebrated for the beauty of its vegetation, was generally thought to be deficient in forest-timber, but it has been discovered that, to the eastward, there are forests of the finest oak of the Albanian kind, celebrated for its quality and durability. These forests also produce iron-wood, the sago-palm, &c.; as yet however they have been but imperfectly examined. Of the African islands, *Madagascar* is rich in timber, and a variety of woods useful in the arts; the same may be said of the islands on the west coast, they are generally well wooded.

America is, of all parts of the world, the most thickly covered with wood. Beginning with the north, we find the Russian territory on the north-west coast abundantly stocked with fine timber: pines 300 feet high and 45 feet in circumference, Canadian poplar, alders 40 feet high below the branches, birch, yew, black and common oak, American ash, sycamore, sugar maple, cypresses 24 feet in circumference, and willows. The islands on this coast have also magnificent forests of pine and other lofty trees.

In *New Britain* the forests are extensive, but they present little variety, and in some parts, to the northward particularly, the larches and birches are stunted in their growth. The environs of Lake Winnipeg are covered with the trees common to Canada.

In *Greenland* there are only a few stunted willows and birches; and

Labrador has merely some pines and pinasters in the valleys.

Canada contains immense forests, though the trees are neither so large nor of such vigorous growth as in the United States. Pines and evergreens are the most abundant, after which come the red and the sugar maple, the birch, the lime, the American elm, and iron-wood, the yew, the common and the mountain-ash; also a great variety of oaks, different from the European species, which does not thrive here.

New Brunswick has large forests of fine timber, particularly pine, which it exports.

Nova Scotia produces good oak, but the principal wood is pine, fir, and birch.

The island of *Cape Breton* furnishes immense oaks and magnificent masts. *Newfoundland*, and the other islands at the mouth of the St. Lawrence, also produce timber fit for naval and other constructions.

The *United States* are abundantly wooded, the cleared land even in some of the Atlantic states being inconsiderable when compared with that still covered with the primitive forests, which contain an immense variety of trees. There are about forty different kinds of oak, fourteen of pine, besides cedar, cypress, and larch; several maples, among which is that from which sugar is obtained, birch, ash, beech, iron-wood, hornbeam, hickory, wild-cherry, and apple, mulberry, poplar, willow, magnolias, elm, chestnut, &c. Of all the states, Ohio perhaps contains the finest forest trees. The woods of Florida present a mixed vegetation, exhibiting the productions of both the north and the south. Thus there is red and white pine, evergreen oaks, chestnut, mahogany, walnut, cherry, maple, logwood, Brazil-wood, and sassafras. There are also in Florida whole forests of red and white mulberry, the finest in America. All European fruits also grow here, and the oranges are finer than in Portugal.

In *Mexico* or *New Spain* there are abundant forests, differing in character according to their position on the heights or in the plains. In the Texas there are great plains covered with palms, while the heights are clothed with the timber-trees of Louisiana. The mountains in the neighbourhood of Guanaxuata and Valladolid are covered with forests, and the Intendance of Mexico abounds in cedar and other large trees.

Yucatan is famous for its logwood and mahogany; the latter is also produced in great abundance round the Bay of Honduras.

Nicaragua has groves of palms which attain an immense magnitude; and in Costa Rica and Varaguay there is fine forest timber.

The *West India Islands* generally abound in wood, though there are exceptions.

In *South America* the Caracas possesses inexhaustible forests, which, besides the finest timber, produce also a great variety of beautiful woods for cabinet-work, dye-woods, drugs used in the arts, and medicinal plants, as the sarsaparilla, bark, &c.

In *New Grenada* the plateau of Bogota, Popayan, and Pasto have fine forests. The neighbourhood of Guayaquil, besides the common timber of the country, possesses a wood remarkable for strength and solidity, which is said to be incorruptible, and to resist worms better than any other; qualities which render it invaluable for the keels and ribs of vessels.

Peru is rich in forests, which furnish timber, gums, resins, dye and cabinet-woods, all of the finest quality.

Chile possesses forests of gigantic trees, many of incorruptible wood, and others useful for their gums, resins, &c.

Pines and cedars are abundant. The whole chain of the Andes abounds in wood, varying in kind according to height, latitude, and aspect. The vigour of the vegetation in some parts is inconceivable: thus in Chile trees have been found so large, that an entire church, 60 feet long, with all its wooden appurtenances of doors, windows, &c., has been built of a single tree. The same country produces apples as large as the head, and peaches weighing 16 ounces.

The *Magellanic lands*, on the west or mountainous part, contain forests.

Paraguay is rich in wood, on the borders of the upper Uraguay; and, among other trees, produces in abundance that from which the resin termed dragon's-blood is obtained.

Brazil contains extensive forests, which cover immense tracts, and are composed of palms, Brazilian cocoa, loftier than the Indian, together with an endless variety of other trees peculiar to the country: some of these are of extraordinary size. The Brazilian pine furnishes very fine masts: this country exports a large quantity of timber, and supplies all the Portuguese shipping. At Bahia ship-building is carried on to a great extent. Brazil also produces the dye-wood which bears its name.

Guiana has extensive forests in its higher parts, but the wood of many of the trees is so soft as to be only good to burn, and that of others is too hard to be worked. It produces many dye-woods.

The forest region of the river Amazon and of the upper Orinoco, according to Humboldt, covers an area of about 719,000 square miles.

From the above rapid sketch of the forest lands of the globe it appears that they still cover a great portion of its surface, nor can it be doubted that the immense tracts of wood we have enumerated exercise a very powerful influence on the physical economy of the earth. This influence is both direct and indirect. The direct influence of forests is the diminution of temperature, effected, according to Humboldt:—'1. By screening the soil from the heat of the sun's direct rays; 2. By the powerful evaporation of moisture from the leaves; and 3. By the immense surface which these same leaves offer to the cooling process of radiation.' This however seems only a partial view of the subject, and it is considered more fully under another head.

The indirect influence is the preservation of that due circulation of moisture by which the fertilizing rivers of the earth's surface are furnished with a perennial supply of water. Such indeed is the importance of forests in this respect, that if it were possible to annihilate at once all the forests that now exist, the earth would no longer be habitable. The rains which fell in the mountains, no longer arrested by the trunks and roots of the trees, would not have time to percolate through the soil and fissures of the rocks to supply the reservoirs of springs, but would pour down in devastating torrents, leaving the water-courses dry as soon as the rain had ceased. This, in a limited degree, has been already experienced in places where the heights have been partially denuded of their forests; and its effect on the rivers in some parts of the United States where the portion of cleared land is considerable, is distinctly observed. Nor would this be all: lakes, for want of supply, would soon be dried up, and as no waters but those of the ocean would then exist, the atmosphere would be deficient in moisture; no vegetation could exist, and the animal world would perish of thirst, hunger, and heat. Forests then, are of primary importance in the economy of the globe, independent of their utility in a thousand arts which are necessary now to our comfort. This consideration has at length awakened governments to the necessity of protecting forests from wanton spoliation by codes enacted for the purpose, and of forming schools in which all that is necessary to be known for the management of forests, so as to maintain a constant supply of timber and fuel, shall be regularly taught. [FOREST SCIENCE.]

FOREST LAWS. In this country even in the time of the Saxons the crown lands consisted in part of forests, or tracts more or less covered with wood, and tenanted by animals of chase, in which the king was accustomed to take the diversion of hunting, and from hunting in which all other persons were prohibited. This distinctly appears from the laws of Canute. But the prohibition against hunting in the royal forests was merely a protection thrown around the property of the crown of the same kind with that afforded to all other landed estates, in regard to which, universally, the law was, that every proprietor might hunt in his own woods or fields, but that no other person might do so without his leave. On the establishment, however, of the Norman government it has generally been supposed that the property of all the animals of chase throughout the kingdom was held to be vested in the crown, and no person without the express licence of the crown was allowed to hunt even upon his own estate. But this after all is rather a conjecture deduced from the supposed principles of feudalism, than a well-established fact. There are no laws respecting the forests among the laws attributed to the Conqueror; and perhaps all that we are absolutely entitled to affirm from the evidence we possess on the subject is, that after the Norman conquest the royal forests were guarded with much greater strictness than before; that their number was extended and possibly in some cases their bounds enlarged; that trespasses upon them were punished with much greater severity; and, finally, that there was established a new system of laws and of courts for their administration, by and according to which not only all offences touching the royal forests were tried, but also all persons living upon these properties were generally governed. This is the system or code that is properly called the forest laws. Yet even of this in its original integrity we have no complete or authoritative record: all our knowledge of it is derived from some incidental notices of the chroniclers; the vague though energetic language of complaint and condemnation in which it is repeatedly spoken of; the various legislative enactments for its reform which have been preserved; and the remnants of it which survived to a comparatively recent period.

The Conqueror is said to have possessed in different parts of England 68 forests, 13 chases, and 781 parks. In the language of the law, forests and chases differ from parks in not being inclosed by walls or palings, but only encompassed by metes and bounds; and a chase differs from a forest, both in being of much smaller extent (so that there are some chases within forests) and in being capable of being held by a subject, whereas a forest can only be in the hands of the crown. But the material distinction is, or rather was, that forests alone were subject to the forest laws so long as they subsisted. Every forest however was also a chase. A forest is defined by Manwood, the great authority on the forest laws, as being 'a certain territory or circuit of woody grounds and pastures, known in its bounds, and privileged, for the peaceable being and abiding of wild beasts, and fowls of forest, chase, and warren, to be under the king's protection for his princely delight; replenished with beasts of venery or chase, and great coverts of vert for succour of the said beasts; for preservation whereof there are particular laws, privileges, and officers belonging thereunto.' The beasts of park or chase, according to Coke, are properly the buck, the doe, the fox, the marten, and the roe; but the term in a wider sense comprehends all the beasts of the forest. Beasts of warren are such as hares, conies, and roes; fowls of warren, such as the partridge, quail, rail, pheasant, woodcock, mallard, heron, &c. He afterwards however quotes a decision of the justices and the king's council that roes are not beasts of the forest, because they put to flight other wild beasts (eo quod fugant alias feras), which seems an odd reason; perhaps the word should be 'fugiunt' (because they fly from other wild beasts). And he adds, 'beasts of forests be properly hart, hind, buck, hare, boar, and wolf; but legally all wild beasts of venery.' (*Co. Litt.* sec. 387.)

For the antiquity of the royal forests in England, 'the best and surest argument,' says Coke, elsewhere (4 *Inst.*, 319), 'is, that the forests in England, being sixty-nine in number, except the New Forest, in Hampshire, erected by William the Conqueror, and Hampton Court Forest, by Henry VIII., and by authority of parliament, are so antient, as no record or history doth make any mention of their history or beginning.' Yet it appears, both from the great charter of John, and from a previous charter granted by Stephen, that some lands had been afforested (as the term was) after the time of the two first Norman kings. 'The forests,' says Stephen, 'which King William my grandfather, and William II. my uncle, made and held, I reserve to myself; all the others which King Henry superadded I render up and concede in quiet to the churches and the kingdom.' And one of the concessions demanded from John and granted in Magna Charta (§ 47) was, that all the lands which had been afforested in his time should be immediately deafforested. No additional forests appear to

have been made from the reign of John till that of Hampton Court was constituted by act of parliament in 1539 (31 Hen. VIII. c. 5). The name given to it in the statute is Hampton Court Chase; but it is enacted that all offenders in it shall incur such penalties as the like offenders do in any other forest or chase. It was therefore made a forest as well as a chase.

Many historians tell us that King John granted a charter of forests at the same time with Magna Charta. This is indeed distinctly asserted by Matthew Paris, who even professes to give the charter at full length. But the statement is entirely unfounded; the concessions obtained from John in regard to the royal forests are, as mentioned above, contained in the Great Charter: the Carta de Foresta, which M. Paris quotes, is a charter granted by Henry III. in the 9th year of his reign (A.D. 1224). This was the first separate charter of forests. It is commonly printed in the statutes from the Inspeximus, or confirmation of it, in the 28th of Edward I. (A.D. 1299). The subsequent legislation upon this subject is principally to be found in the following statutes:—The Customs and Assize of the Forest, or the Articles of Attachments of the Forests (of which the date is not known); the Ordinatio Forestæ of the 33 Edw. I. (1305); the Ordinatio Forestæ of the 34 Edw. I. (1306); the 1 Edw. III. c. 8 (1327); and the 7 Ric. II. c. 3 (1383).

One of the chief things insisted upon in the early national demand for the reform of the forest laws, was the mitigation of their severe code of punishments. The Conqueror, who, as the 'Saxon Chronicle' says, 'loved the red deer as if he had been their father, is affirmed to have visited the slaughter of one of these animals with a heavier penalty than the murder of a human being. And it would appear from the charter of Henry III. that the offence had previously been punishable not only with mutilation, but with death. 'No man from henceforth,' says the 10th clause or chapter of the charter, 'shall lose either life or member for killing of our deer; but if any man be taken and convict for taking of our venison, he shall make a grievous fine, if he have anything whereof; and if he have nothing to lose, he shall be imprisoned a year and a day: and after the year and day expired, if he can find sufficient sureties, he shall be delivered; and if not, he shall abjure the realm of England.' According to Matthew Paris (whose authority however, on such a matter, is not worth much), Richard I. had already repealed the penalties of mutilation for offences against the forest laws.

The forest laws, as already mentioned, were administered by their own officers and courts The officers were the justices in eyre of the forest [EYRE]; the wardens or warders; the verderers, foresters, agisters, regarders, keepers, bailiffs, beadles, &c. The courts were —. The Court of Woodmote, or of Attachments, sometimes called the Forty Days' Court, held once in every forty days before the verderers; 2. The Court of Swainmote, held three times in the year before the verderers as judges, and with a jury composed of the *swains*, or freeholders within the forest; and 3. The Court of Justice-seat, which was the supreme court, held every third year before the chief justice in eyre of the forest. This was a court of record, and, at least in later times, it was held that a writ of error lay from it to the Court of King's Bench. With the exception however of one said by Roger North in his life of Lord Keeper North to have been held *pro forma* soon after the Restoration, no Court of Justice-seat has been held since 1632. A minute survey of the forest was also taken every third year by its twelve regarders; and it was upon this occasion, and under the inspection of the regarders, that the lawing or expeditation of all the mastifs in the forest took place, which consisted in cutting off the claws and ball (or pelote) of their forefeet, to prevent them from running after the deer.

The four principal forests in England were accounted to be, the New Forest, Sherwood, Dean, and Windsor. Among the others were Epping, in Essex; Dartmoor, in Devonshire; Wichwood, in Oxfordshire; Salcey, Whittlebury, and Rockingham, in Northamptonshire; Waltham, in Lincolnshire; Richmond, in Yorkshire, &c.

The vexatious and oppressive powers vested in the crown by the forest laws, after having to a great extent long ceased to be exercised, were revived by Charles I., and endeavoured to be turned to account in replenishing his empty exchequer. At the Court of Justice-seat, held in 1632, before the earl of Holland as chief justice in eyre south of the Trent, large sums of money were extorted from many persons, chiefly as compositions for alleged encroachments on the antient boundaries of the forests, although after a quiet possession of three or four centuries. This accordingly was one of the grievances to which the Long Parliament directed its earliest attention. One of the Acts which that assembly passed in its first session (the 16 Char. I. c. 16), was entitled 'An Act for the Certainty of Forests, and of the Meets, Meers, Limits, and Bounds of the Forests,' which set forth in the preamble, that not only judgments had of late been given by which the bounds of some of the forests had been variously extended, or pretended to extend, beyond the bounds commonly known, and formerly observed, to the great grievance and vexation of many persons having lands adjoining; but there had also been some endeavours or pretences 'to set on foot forests in some parts of this realm and the dominion of Wales, where, in truth, none have been or ought to be, or, at least, have not been used of long time.' It is therefore enacted that the bounds of every forest shall be those commonly known, reputed, used, or taken to be its bounds; and that all judgments, &c., to the contrary shall be void; that no place where no Justice-seat or other forest court had been held within sixty years should be accounted forest; and that commissions should be issued for ascertaining the bounds of forests as they stood in the 20th year of the preceding reign, and beyond which they should not thenceforth be extended. Since the passing of this Act, the old forest laws may be considered as having been practically abolished, and the offices connected with their administration and execution turned into little better than sinecures.

The 11th chapter of the Carta Forestæ of Henry III. contains the following curious provision:—'Whatsoever archbishop, bishop, earl, or baron, coming to us at our commandment, passeth by our forest, it shall be lawful for him to take and kill one or two of our deer, by view of our forester, if he be present; or else he shall cause one to blow an horn for him, that he seem not to steal our deer; and likewise they shall do returning from us as it is aforesaid.' As this law is still unrepealed, any bishop or nobleman may shoot one or two of the deer if he should pass through any of the royal forests in going to or returning from parliament. Hunting, it may be observed, was formerly so common or universal an episcopal amusement, that the crown is still entitled, at the death of every bishop, to have his kennel of hounds, or a composition in lieu thereof. Auckland Park, and certain other demesnes, formerly held of the bishop of Durham by forest services; 'particularly,' says Camden, 'upon his great huntings, the tenants in these parts were bound to set up for him a field-house, or tabernacle, with a chapel, and all manners of rooms and offices; as also to furnish him with dogs and horses, and to carry his provision, and to attend him during his stay for the supply of all conveniences. But now all services of this kind are either let fall by disuse, or changed into pecuniary payments.' [GAME LAWS; WOODS AND FORESTS.]

FOREST SCIENCE, constitutes a separate and distinct branch of education, which originated in Germany from the increased scarcity of wood. The first special instruction of this kind was given by Mr. Zanthier at Ilsenburg, near the Harz forest, and its importance being immediately appreciated, forest academies soon multiplied, particularly in the central parts of the country. Prussia directed particular attention to the subject, and the present king, on coming to the throne, ordered that, 'in future, situations in the forest department should be conferred with a view to the most perfect preservation of the forests; that the nominations should be founded on knowledge and experience, and no longer granted as a recompense for service.' In consequence a new organization took place, and competent instruction in all things appertaining to the management of forests became a necessary qualification for an appointment to any post in the forest department.

In the forest academies are taught botany generally, and particularly as regards the ordinary productions of the forest, including vegetable physiology, mineralogy, zoology, chemistry, surveying, mensuration, mechanics, the methods of resisting the encroachments of sands, draining and embanking, together with the care and chase of game; as also the laws and regulations of forest administration. The examination which the candidates undergo is very strict, and the result of the system has been eminently beneficial.

France has also a particular administration of the forests, and a very detailed code of forest laws. Russia, from the immense extent of its forests, is under little apprehension of a scarcity of wood, nevertheless the consumption of this article is so enormous, all the houses of the peasantry being built of it, and no other fuel being used, that it has been deemed advisable to pay some attention to the subject, and a board has been formed under the particular sanction of the government for the better preservation of the forests and more general instruction in forest science.

Louis XIV., by an *ordonnance* of 1669, placed the forests under the direction of a separate branch of the government. Men of science then began to turn their attention to this subject. Du Hamel, du Monceau and Buffon were among the first naturalists who wrote on the management of forest trees.

The consideration of the various trees which may be cultivated to advantage, and the uses to which their woods may be put, with the mode of their propagation in various soils, forms a branch of forest science.

The following is a list of the principal forest trees:—

The oak (Quercus), and its varieties, the beech (Fagus sylvatica), the hornbeam (Carpinus betulus), the birch (Betula alba), the elm (Ulmus), the maple (Acer campestre), the alder (Betula alnus), the ash (Fraxinus excelsior), the lime (Tilia sylvestris), the chestnut (Fagus castanea), the walnut (Juglans regia), the crab (Pyrus malus), the wild cherry (Prunus avium), the mountain service (Sorbus aucuparia), the service (Sorbus domestica), the aspin (Populus tremula), the white poplar (Populus alba), the common poplar (Populus nigra), the Lombardy poplar (Populus fastigiata), the sycamore (Acer pseudo-platanus), the plane (Acer platanoides), the hasel (Corylus sylvestris), the sallow (Salix capræa), the osier (Salix viminalis), the pine (Pinus sylvestris), the silver fir (pinus picea), the larch (Larix Europea). The wood of all those trees is divided into three sorts: hard wood, white wood, resinous wood. The German writers admit only two sorts of trees, the deciduus and evergreen, but this is more a botanical division than one applicable to forest-trees.

The uses to which the wood is applied vary much, according to circumstances and situations. The most profitable is that of timber for buildings, and more particularly for naval architecture. The oak, beech, elm, and fir, are the chief woods employed for this purpose; but the chestnut was at one time considered as equal to the oak, as the roofs and beams of many old buildings testify; Windsor castle among the rest. For millwrights the ash, beech, service tree, walnut, and crab, are most useful. For various utensils for the dairy and domestic use, the sycamore, the lime, and the poplar, are used on account of the whiteness of their wood. Various soft woods are used for turning, as well as the hardest, when they have a close grain and are not apt to split.

When wood cannot be applied to building or domestic uses it is still very valuable as fuel, and in this point of view it is important in those countries where pit coal is not abundant. The best wood for fuel is oak, and next to this beech. The harder the wood, in general, the more heat it gives out in burning. The trunks of large trees, sawn into convenient lengths and then split into billets, make the best fuel; but where wood is scarce it is found most profitable to cut down the trees at the age of 30 or 40 years at most, when they have acquired a considerable height of stem but no great girth. In the woods which are planted for this purpose in France and Germany the trees are drawn up by being left close together, and the side branches are kept cut to the height of 30 or 40 feet, so that they only spread out at top, and the trunk never acquires the size which it would if the tree stood singly, and had room to spread out its branches.

In order to judge of the value of woods in different soils the following table may be useful. It is calculated on the supposition that the ground is covered with trees as much as it will bear.

The cord here alluded to is 5 feet 6 inches in height, 8 feet long and 3 feet 6 inches wide, French measure, that is very nearly 6 feet high, 8 feet 8 inches long, and 3 feet 10 inches wide, or 200 cubic feet English measure.

In the following table the tops made into charcoal and the faggots are reduced to cords in the proportion of four and a half cords of charcoal-wood and 550 faggots for one cord of fire-wood.

Produce of Fire-wood per acre, at different ages, in cords.

On Poor Soils.	Middling Soils.	Good Soils.
2	3½	4½
2¼	5¾	9
3¼	9½	15
5¼	13¼	21
6¾	16¾	27
7	21	35
7	24½	42
6	31	56
5	37½	70
3	41½	80
2	46	90
1	48½	96
.	51	102
.	57	114
.	62	124
.	64	128
.	67	135
.	60	120
.	55	110

This table is the result of careful measurement of woods cut down at different ages; and it shows that the maximum in poor soils is attained in thirty-five years, in middling and good soils at 200. But it also shows that the increase of wood per cent. in ten years is greatest from twenty to thirty in poor soils, from forty to fifty in middling soils, and from seventy to eighty in good soils: so that it never can be profitable to allow any wood which is to be used for fuel to stand above eighty years.

In good soil at thirty-five years growth the wood in the tree has increased one cord per acre each year; and the rate of growth increases till the ninetieth year, after which it begins to diminish. But it must also be taken into the account that wood of the age of seventy, eighty, and ninety years is of far greater specific gravity than that of twenty-five or thirty; and consequently the increase in bulk in ten years, from eighty to ninety, produces more fuel than the mere measure indicates. On good soils oaks and beech will continue to increase for 200 years; but in poor soils they do not thrive after thirty-five years, and then they begin to waste.

Preparatory to making a plantation of any extent it is necessary to establish a nursery to raise plants; for although trees which are raised from seed and have never been moved become much larger and finer than those which are transplanted, it will be found on calculation that a quick return is much more profitable; and as a matter of economy trees which have been raised in a nursery and transplanted arrive sooner at a certain growth than those which are sown on the spot where they are to remain.

The ground chosen for a nursery should not have a better soil than that in which the plants are finally to be placed, because, in that case, they would most likely suffer, if not perish altogether. The surface may be enriched by some manure to make the seed vegetate. If it is small, it may be sown in drills, and the acorns and larger seeds may be dibbled regularly as beans are in a garden. The ground being kept very free from weeds by hoeing, the plants will rise regularly, and they may be thinned out after the first year; those which are taken out may be transplanted after cutting off the tap root, in another spot in the nursery. When the trees are three or four years old, and have clean and straight stems, the side branches having been carefully pruned off, they may be transplanted where they are to remain. The ground should be trenched and well drained if it is wet. It is useful in northern climates to plant hardy evergreens, such as the Scotch fir, amongst forest trees, to serve as shelter to them while they are tender. These are called nurses, and are gradually cut out, as the oaks, ash, beech, and other more valuable trees grow up. If the ground is dry it is only necessary to dig a hole eighteen inches deep and a yard in diameter, for each tree; this is to be half filled up with the loose earth taken out; the young tree is then to be placed on this surface and its roots spread out, the tap root being cut off. The best earth is then carefully spread over the roots and trod in with the feet, and the whole filled up to the level of the ground. In wet situations the trees are sometimes placed nearly on the surface of the ground, and a small mound of earth is raised round the stem; but it is much better to drain the land properly, without which the plantations

will never thrive. The proper distance to plant oaks is ten feet apart each way, with a fir-tree between every two. In five years half of the firs may be cut out, and the oaks pruned where it is necessary. In fifteen years all the firs will be cut out and the oaks will be able to protect one another. In twenty-five years from transplanting, half of the trees may be cut down, and the remainder thinned out gradually as they spread and advance in growth.

In England, where crooked pieces of large oaks are of value in ship-building, the side branches are not taken off higher than fifteen or twenty feet from the ground; and where trees have plenty of room, as in hedge-rows or parks, this may be judicious, but in close plantations it is of advantage to have a long stem without branches; in France and Germany the branches are always cut off to the height of thirty or forty feet. This is done gradually as the tree grows. When the branch is very young it may be cut close to the tree, and the bark will soon cover the wood and obliterate the scar. When they are larger, it is best to shorten them to a few inches from the stem the first year, and cut them close the next: when a branch is cut close in a young tree no portion of it must project beyond the wood of the stem, and if a portion of the bark of the latter is cut to make all smooth it will be no detriment, and the wound will soon heal over provided it is done at the proper time. But if a large branch is cut so that the bark cannot grow over the wound in one year, there is great danger of causing a fault in the wood by the decay of the heart of the branch; in that case it is better to cut it at some distance from the trunk, and to shorten it repeatedly till the branch dies naturally and breaks off. In that case no flaw will be found in the wood. This is the operation of nature in a close wood, which we should endeavour to imitate.

FORESTALLING is an offence at common law against trade: it is described in the statute 5 and 6 Ed. VI. c. 14, to be the buying or contracting for any merchandize or victual coming in the way to market, or dissuading persons from bringing their goods or provisions there, or persuading them to enhance the price when there, any of which practices were supposed to make the market dearer to the fair trader. All the statutes concerning this offence were repealed by the 12 Geo. III. c. 71, and now the general penalty for this as well as other minute misdemeanours is, by the common law, discretionary fine and imprisonment. (4 Bl. *Com.*)

The true principles of trade being now better understood, prosecutions for the offence are unknown; and by stat. 7 and 8 Geo. IV. c. 38, it is enacted that no constable shall be required to make presentments of forestallers at any gaol delivery or quarter sessions. The prohibition seems to have been derived from the Roman law, which imposed a penalty of twenty pieces of gold in such cases. (*Dig.* 48, tit. 12. 2.) [REGRATING; INGROSSING; MONOPOLY.]

FOREZ, a district in France, the largest of the three subdivisions of the province of Lyonois. It was for the most part comprehended in the territory of the Segusiani, and Feurs, or Feurs, one of its chief towns, was the Forum Segusianorum of the antients—a town of some importance, and probably a Roman colony. From this town the districts derived the designation of Pagus Forensis, from whence Forez. It was comprehended, in the division under Honorius, in the province of Lugdunensis Prima, and afterwards formed part of the kingdom of the Burgundians, from whose dominion it passed to that of the Franks. It was bounded on the north by Bourgogne, on the north-east by Beaujolois, on the east by Lyonnois Proper, on the south by Velay and Vivarais, on the west by Auvergne, and on the north-west by Bourbonnois. The territory thus defined consists for the most part of a portion of the valley of the Loire, and of the slope of the hills which separate that valley on the east from Lyonois and on the west from Auvergne. It comprehends the coal-field (or part of it) of the best quality in France; produces iron and lead, and is the chief seat of the hardware manufacture: St. Etienne, the Birmingham of France, is within its limits. It produces also abundance of fir-timber and excellent turpentine; and corn, wine of good quality, and excellent hemp. It is watered by the Loire and several of its tributaries, and extends in one part across the hills which ordinarily bound it on the east down to the river Rhône.

The district of Forez was subdivided into Haut Forez, capital, Feurs; Bas Forez, capital, Montbrison (population in 1832, 5040 for the town, 5265 for the whole commune); and Rounnois, capital Roanne (population 8890 for the town, 9260 for the whole commune). It is now comprehended almost entirely in the department of Loire: a small portion is included in that of Haute Loire.

The other principal towns of the ci-devant Forez, with their population in 1832, are—St. Bonnet Le Château (2079 town, 2169 commune), Bourg Argental (1734 town, 2502 commune), Chazelles sur Lyon (3079 commune), St. Etienne (33,064), Firmini (2436 town, 3779 commune), St. Galmier (1800 town, 2559 commune), St. Genêt-Malifaux (3274 commune), St. Julien en Jarret (3231 commune), St. Just sur Loire (1525 town, 2500 commune), La Fouillouse (3471 commune), St. Rambert (3015 commune), Val Benoîte (4483 commune), and Baron-Basse (5528 commune).

Forez, Beaujolois, and Lyonois constituted in the middle ages a county which was rendered hereditary by Guillaume, one of the officers of Charles Le Chauve. He was about A.D. 890 succeeded in Lyonois and Forez by one of his sons, and by another in Beaujolois, which thenceforward constituted a separate lordship. At a subsequent period these counts seem to have lost first the jurisdiction of the city of Lyon and afterwards of Lyonois, through the increasing power of the archbishop of that city. The county of Forez afterwards came into the hands of the dukes of Bourbon, and was, together with their duchy, united to the crown.

FORFAR, the county town of Forfarshire, is an antient royal burgh, situated 13 miles north of Dundee, in the great valley of Strathmore. The ruins of a royal palace are still to be seen on the top of a mount. A figure of this castle, cut in stone, forms the heraldic device of the borough. Here Malcolm Canmore held his first parliament in 1057, after recovering his kingdom from the usurpation of Macbeth. The town was burned and plundered by Cromwell's troops, when all its written documents were lost. It is recorded that nine poor women were burned for witches at the end of the seventeenth century, and that in the reign of James VI. the weekly market-day was on Sunday. An iron collar, called the witches' bridle, is still preserved in the town; it was fixed on the head by two iron spikes put into the mouth, and by a long iron chain attached to it the dreaded agent of Satan was led to the flames. The houses are neat and well built, though the streets are irregular, as in every antient town. The church is a very spacious and ornamental edifice. There is also an episcopalian chapel, and a new and elegant town-house serves at once for judicial and other public purposes and a prison. Three endowed public schools are well conducted in commodious rooms. The town being the seat of the county courts, is the residence of many members of the legal profession. The linen manufacture is very extensively carried on. Several hundred looms are employed, and the quantity annually produced of Osnaburghs and various other kinds of linens is about 2,500,000 yards, the value of which exceeds 100,000*l*. Shoes, called brogues, are made in large quantities for exportation. This town is also distinguished for its breweries of porter and beer. Of late years many improvements have been made in the general appearance of the place and its institutions. An excellent botanic garden, first laid out by the celebrated Mr. Don, who resided here, has been replenished with a great variety of indigenous and exotic plants. A nursery too has been formed, containing nine acres planted with all kinds of fruit and forest trees. The inland situation, 15 miles from the sea-coast, is disadvantageous for commercial business; but the active spirit and industry of the inhabitants secures to the town a satisfactory degree of prosperity. In 1831 the population was 7950.

FORFARSHIRE is a maritime county on the east side of Scotland. Though it usually takes the name of Forfar, the county town, it is also named Angus, probably from the high land, south of the town of Montrose, called the Hill of Angus, on which the Caledonians assembled to watch the landing of their Danish invaders; or rather, as stated by other authorities, because this county was disjoined from the contiguous county of Kincardine or Mearns, by Kenneth II., who assigned it to his son, Æneas, or Angus, about A.D. 838. Its eastern boundary is formed [illegible] g course [illegible] Ocean; on the south it has the Frith [illegible] innumerable mounshire; on the west, Perthshire; on the [illegible] the northern bound-Aberdeen, and on the north-east the [illegible] ving the West Water it lies between 56° 27′ and 56° 59′ [illegible] uth easterly through a 23′ and 3° 23′ W. long. The extrem[illegible] about three miles north from south to north in a straight lin[illegible] scends from the Gram- [illegible] the bottom of which it

foams from rock to rock with a picturesque beauty, which has been artificially improved by the elegant taste of Lord Gordon, in whose estate it flows. No part of this stream is navigable. 2. The South Esk issues from the north-west summits of the Grampians, and having received numerous mountain streams, it descends into the valley of Strathmore, where it is further augmented by several brooks: continuing easterly by the town of Brechin, it passes through the basin of Montrose into the sea. On several of its falls are erected flax spinning-mills, and other machinery. 3. The Isla rises from numerous torrents among the Grampian summits on the north-west side of the county. Its course is south-west to near Ruthven, where it turns off to join the Tay, in Perthshire. Like the North Esk, in escaping from the Grampians, it has worn a chasm in the granite rocks more than a hundred feet perpendicular; and it forms cascades of the greatest beauty. One has a clear precipitous fall of at least 35 feet. The banks are very steep and richly wooded for several miles, and the scenery, at the junction of the Melgam water is made highly romantic by the extensive ruins of the antient fortified castle of Airlie. The Dean, Lunan, Dighty, and other smaller streams, are not of sufficient magnitude for particular notice. Numerous perennial springs flow from the sand-stone hills. One at Kirktown, in the parish of Kinnettles, emits 25 gallons per minute, or 36,000 per day.

The principal roads branch off from Dundee—1, to Aberbrothwick, Montrose, and thence to Aberdeen; 2, to Forfar and Brechin; 3, to Cupar Angus and westward. These, and other lines of internal communication, are kept in good order. There are numerous stone and wooden bridges across the small streams. The principal one is over the North Esk, on the road from Montrose to Kincardine. A rail-road from Dundee crosses the south-west extremity of the county to Perthshire.

Woods and Plantations.—Numerous trees found in the mosses and marshy ground, consisting of enormous oaks, ashes, elms, and birches, indicate that formerly the lower part of this county was covered with forests. Some of the Grampian glens are partially clothed with oak and hazel coppices and natural birches; and others are covered with thriving plantations, but trees do not grow on the higher parts of the mountains. Near the sea-shore trees do not thrive unless when planted in ravines, or behind banks by which they are sheltered. Plantations are confined chiefly to places not suitable for the plough—to thin moorish soils resting on clay or gravel; but in gentlemen's parks and pleasure-grounds trees occupy soils of the best quality. On the declivities of the Sidlaw Hills extensive tracts have been planted with forest trees, chiefly larch, oak, ash, elm, plane, beech, and poplar. Scotch, spruce and silver firs are planted to shelter the other young trees. Plantations are thinned twelve years after planting, and the tallest and straightest sticks are exported to Kent for hop-poles. In the parks of the gentry and around the old farmsteads are many stately trees of unknown antiquity. Larch, oak, and beech plantations are continually increasing. In the 'Agricultural Survey,' by Mr. Headrick, the space occupied in plantations in 1813 is stated to have been 20,764 acres, which is supposed to be now doubled. Many wealthy proprietors have planted very extensively. The Earl of Airlie alone, since 1811, has planted above 3000 acres near Ruthven. Beautiful inclosures and plantations now appear in every parish. The largest wood is that of Monreman Moor, near Brechin.

The plants of this county have been investigated with great industry and ability by Mr. George Don, who was born and resided there, and who added more new species to the British Flora than any botanist before or since. His ample and curious account of the native plants in Forfarshire, published in 'The Agricultural Survey,' exhibits abundance of interesting facts for the scientific botanist.

Climate.—The great variety of elevation in the maritime, inland, and alpine districts causes a correspondent variety of climate. On the high lands among the Grampians, where the snow lies on the summits during the greater part of the year, the air is generally cold and piercing. In the great midland valley, and in the sheltered parts of the maritime district, the climate is comparatively mild and genial. On the coast the easterly winds are occasionally very severe. The heaviest rains are from the east and south-east, and the deepest falls of snow from the north and north-east. In the evenings of warm summer days a chilling wind, accompanied with a damp and thick haze, often comes from the sea. It is very offensive to the feeling, and productive of colds and rheumatisms, and when precipitated on the earth as hoar-frost is injurious to vegetation. On the whole this county may be said to be rather bleak and unfavourable to delicate constitutions: however, the draining of marshes and stagnant ponds, and the general improvements in cultivation, have greatly ameliorated the climate, and notwithstanding the general variableness and inclemency of the weather, the native inhabitants are a healthy and vigorous race.

Estates, Farms, Agriculture.—About a century ago a great proportion of this county was in the hands of a few antient families; but since the introduction of trade and manufactures, landed property has changed its possessors very frequently, and thus become much more minutely divided and more equally distributed, so that, of the forty barons mentioned by Edwards, in his Description of Angus in 1678, only about one-third have at present any possessions in the county. In Mr. Headrick's 'Survey' the value of a large proportion of the estates is stated to be from 100*l.* to 1000*l.* a year; a few from 2000*l.* to 6000*l.*, and one or two above 12,000*l.* a year. The greatest number of the estates are held by charter from the crown, and are termed freehold. Farms vary much in size, some consisting only of 20 or 30 acres, others of 800 acres. They are generally from 100 to 250 acres, but many are less than 100 acres. Leases in the lowland districts are taken usually for nineteen years; in the Grampian highlands for nine years. About one-third of the land in this county is held under deeds of entail, a system which, for the sake of perpetuating a family name, reduces the proprietors to mere life-renters, chills all ardour for improvement, and thus injures the interests of the county. Mr. Headrick gives the following statement of the number and value of farms in 1813:—

Yearly Rent.	Number of Farms.
Under 20*l.*	1,574
From 20*l.* to 50*l.*	565
50*l.* to 100*l.*	682
100*l.* to 300*l.*	315
above 300*l.*	86
Total number	3,222

The walls of the old farm-houses were all constructed with turf and stones in alternate layers, and the roofing was formed of branches of trees and turf, or thatch fastened on with rope. One of these enclosures, with one door and no window, lodged the farmer's family and his cattle, who all slept round a fire on the earthen floor. A hole in the roof let out the smoke, and in the day-time it was a skylight. The position of the dunghill beside the door made the entrance ankle-deep in mire, and filled the dwelling with a continual stench. Many of these dirty, damp, and smoky cabins, with the improvement only of a small glass window, are still to be seen among the Grampian hills. Some are built with mud, mixed up with straw. It must however be remarked that they are every year decreasing in number. The following remarks are made by the reverend author of the description of the parish of Lunan in the 'New Statistical Account of Scotland:'—'It is a subject of deep regret that little attention has been paid to the habitations of the cottagers. Scotland in this respect is very far inferior to England. In vain we look for the neatly white-washed walls, with their doors and windows encircled with roses and evergreens, and the small tasteful garden in front, so often to be met with in England. Of late years farm-houses and farm-steadings have been generally made commodious and useful, but the cottages of the poor remain for the most part in their pristine wretchedness. In Scotland they have always been proverbially deficient in comfort and neatness.' It is in the eastern lowland districts that the greatest improvements are displayed in the farmers' dwellings and offices. Here the former are commonly built of red sandstone, of two stories, lathed and plastered, and roofed with thatch, blue slate, or sandstone flags.

The number of hands employed in the pursuits of agriculture is estimated at 20,000, without including the great numbers occasionally engaged in seed-time and harvest, and in weeding and making hay. It may in general be stated that almost every useful improvement has been adopted in the modes and implements of agriculture in this county, and that the farmers of Forfarshire cannot be said to be behind those of the most improved counties of Scot-

land. Threshing-machines and iron ploughs, improved harrows, drilling-barrows, hoeing-machines, &c. are commonly used. Various grasses have been made very productive by the adoption of the grass-seed-sowing machine; and besides the use of farm-yard dung, lime, lime-marl, clay-marl, rock-marl, whale-blubber, soot, mud-compost, and sea-weed, as manure, bone-dust has become generally used, particularly for crops of turnips, and large mills are established at Dundee and Aberbrothwick for preparing it. Draining of various kinds is practised extensively. Inclosures are made chiefly by stone dykes in the highlands, and by quick-thorn hedges in the plains of Strathmore and towards the sea.

Breeds of stock have been much improved, and several active Agricultural Societies, of which the principal is the Eastern Forfarshire Farming Association, exercise a great influence in the introduction of superior modes of culture and breeding. Mr. Headrick remarks that all classes of the farmers of this county are abundantly sharpsighted, and disposed to adopt any improvement which they see executed by others, or hear described, and that they have a disposition to surmount difficulties by persevering labour and assiduity. The chief crops are of oats, barley, and wheat. The rotation of crops is varied according to different soils. Particulars on this subject will be found fully detailed in 'The Agricultural Survey,' and in the 'New Statistical Account of Scotland.' Oats appear to have been the first species of grain cultivated in Scotland, and are probably indigenous, as wild oats abound in various parts of this county. They still form the prevailing crop, oatmeal and potatoes being the principal articles of food of the great mass of the population. Oats are sown after barley and other crops, but commonly after grass or old pasture has been turned up, several times in succession. Being a very hardy grain, the soil requires less preparation than for any other kind of crop; but they soon degenerate unless the seed is continually renewed from other soils of a different quality and aspect. The kinds of oats cultivated are—1, the common or Angus oat; 2, the Blainsley oat, a small grain yielding abundantly on high and poor land; 3, the barley oat, which requires a good soil and ripens early; 4, the Dutch oat, a large grain in a thick and ample husk; 5, the bearded grey, or black oat, a poor inferior species, which formerly prevailed throughout the county: it grows spontaneously, but is confined for crops chiefly to the Grampian district; 6, the potato oat, which, in all the fertile tracts, has nearly supplanted every other species. Much of the oat crop is consumed by horses and exported from the county. Oatmeal porridge, eaten with milk or beer, forms the breakfast and supper of the labouring classes, among whom oat-cakes are still much used as bread. Their supper commonly consists of sowens, a thick gelatinous and slightly acidulated substance, obtained by steeping the oat-bran in water to extract the still adhering portion of farina and starch.

In refuting the opinion that this immoderate use of oatmeal by the peasantry produces 'the Scotch Fiddle,' and other cutaneous diseases, Mr. Headrick asserts that such disorders are much more prevalent in some of the English counties where oatmeal is not used, and that 'The Fiddle' is attributable solely to dirty clothing.

Wheat was formerly confined to the lower maritime district, and was thought to be too delicate to thrive in the mountainous parts, but it is now successfully cultivated at all elevations less than a thousand feet above the level of the sea. Three-fourths of the wheat are sown after summer fallow, the land being well dunged and lined, or manured with compost. The seed universally degenerates if not continually renewed. For this purpose a considerable quantity of seed-wheat is annually imported from England; it being found that this grain, more especially than others, improves by being transferred from a warmer to a colder climate, and crossed by different soils. The seed obtained from London is most esteemed. For the purpose of preventing smut it is commonly steeped in brine; all that floats is skimmed off, and sometimes powdered quicklime is afterwards sprinkled over the grain. Wheat receives scarcely any culture after it is sown. It is reaped from the middle of August to the end of October, according to the time of sowing. Wheaten bread is now generally used by all but the poorest classes. Considerable quantities of wheat are annually exported to London and other ports, and some American, Danzig, and other foreign wheats are imported to mix with that produced in the county.

A species of barley called *Bear*, or *Bere*, *Bigg*, and *Chester* is that which alone was antiently cultivated. It has six rows of grain in the ear, by which it is distinguished from the common barley, which has only two rows. It is a coarser and less valuable species; has a thicker husk, and the awn is longer and more firmly united with the grain. The bleak and elevated lands on the Grampian and Sidlaw mountains are the chief places where it continues to be cultivated, as it thrives on poorer soil and with less cultivation than are requisite for the common barley. The latter is largely sown on all the superior soils and better cultivated tracts. No precautionary preparation of barley seed is used, but it is found necessary, or at least prudent, to renew it annually either wholly or partially from England. Much bear and barley are ground into meal for porridge and cakes consumed by the poorer class of labourers; but in nutritious properties it is much inferior to oatmeal. Hulled pot or pearl barley is much used in the county by all classes in meat broth, commonly mixed with vegetables. This is an antient and very general Scottish dish. Pearl barley is largely exported to Leith and London. The ale and beer breweries of the county, and distilleries for whiskey, consume a great portion of the produce of barley. It is also exported for the same purpose to Leith.

Peas are partially cultivated, chiefly for the haum, or straw. Beans are more generally raised as food for horses and swine. Vetches are also cultivated for feeding cattle. Turnips are grown to a greater or less extent on every farm. The seed is never sown broadcast, but always by drill-barrows, and this is practised even in gardens. The Swedish turnip is much used for feeding milk-cows, and is given sliced to horses. Cabbage and colewort are also seen on almost every turnip-field, chiefly for the same use. Flax is now not near so general a crop as it was formerly. Red and white clover are common, and are usually mixed with rye-grass, which is universally cultivated.

A large portion of the surface of this county on the Grampian and Sidlaw Hills is covered with natural pasture. This extent of land, rendered unfit for the plough by the number of loose stones and other obstacles, is estimated at about 40,000 acres. In some of the valleys Grampian boulders of two or three tons weight have been got rid of by blasting with gunpowder, or by dragging them off on sledges, or by burying them below the reach of the plough. Every farmer has some portion of his land laid out in cultivated pasture for his cows, in the rotation of cropping. The parks and lawns of the gentry are either stocked with cattle and sheep by their proprietors, or let to graziers. Potatoes are extensively cultivated on every farm and in every garden, and large quantities are exported to Leith and London. Mr. Headrick relates as a curious instance of the influence of learned ignorance, that when, a century ago, a farmer first introduced the potato as a field crop, scientific physicians of that time pronounced the plant to be a species of the deadly nightshade, so that no one would venture to eat of its root, and the poor man, who had made several journeys to Ireland to learn the mode of cultivation, was laughed at, and died in great poverty.

Farm servants live chiefly on potatoes and oatmeal, varied occasionally with pork or bacon; their drink is either milk or beer, and the wages of those who are not fed in the farmer's house are commonly paid wholly or in part with measured quantities of meal, milk, and other domestic provisions.

Gardens and Orchards.—All the resident proprietors have gardens varying from one to five acres, well stocked with all the roots and culinary vegetables which thrive in this climate, and with all the common species of apple, pear, cherry, and plum. Flowers and ornamental shrubs adorn the pleasure-grounds of the wealthy, and here exotic and other plants and fruits which will not thrive in the open air, as grapes, pine-apples, peaches, and nectarines, are reared by horticultural science in artificially heated houses of glass. Most of the cottages have a kail-yard, in which are raised cabbages, onions, and pot-herbs. All the small and hardy fruits, as gooseberries, currants, and raspberries, are plentifully produced in almost every garden. In the neighbourhood of the towns there are market-gardens and nurseries for the supply of the inhabitants. These are particularly good in the vicinity of Dundee. But many apple and other large fruit-trees grow much into wood, yield little fruit, become covered with lichens, and often die at top, which has partly been attributed to the roots having pene-

trated into an unfavourable subsoil; to prevent which it has been discovered that in the old abbey orchards the monks paved with large flagstones the bottom of the deep hole in which the trees were planted.

Live Stock. Wild Animals.—The antient breed of horses in this county is small, but very hardy, and capable of enduring much fatigue with scanty nourishment. These animals are still numerous in the Grampian district. Their colour is grey, and they are commonly called Garrons. In some of those parts of the county where there are either no roads, or very steep and rugged ones, and where the farmers are obliged to keep many horses to fetch peat from the heights, and carry burdens, instead of conveying them on wheel-carriages, this breed of horses has a peculiar value. They feed chiefly on the stunted grass which they find on the sides of the mountains.

In the lower districts this breed has been much improved in size and form by good and regular feeding, and shelter from the perishing wintry winds; but generally throughout the midland and maritime plains are found the larger animals of the Lanark breed, which, as stated in 'The Agricultural Survey,' are the best working horses in the world. They cost from 30*l.* to 40*l.* each.

A few gentlemen rear horses for the turf, and keep studs of thorough-bred racers. Of late years much attention has been given to the breeding and treatment of horses, and very great improvement has been effected in their qualities, value, and appearance. Formerly as many as six wretched garrons were placed abreast in a large clumsy plough, and the driver, walking before them, struck them in their faces to make them follow him; now a pair of smart horses work a light iron plough, without a driver, and sometimes without any reins. The whole number of horses in 1813 was about 9000, and their value about 220,300*l.* In remarking that it is mere prejudice and inveterate habit that causes us to loathe the flesh of horses while we devour that of oxen, the learned and philosophic author of the 'Agricultural Survey' asserts that he once partook of a ham of a young horse, and found it extremely palatable: he adds that he also partook of a fattened old horse aged above twenty-two years, and that he could not distinguish the flavour from that of beef of the finest quality.

Before the introduction of inclosures, turnips, clover, and sown grasses, the size of black cattle was diminutive, and eight or ten were usually yoked in one plough. The great influence of superior feeding and treatment is shown in the fact, that the same breed of oxen which, when reared on the antient plan still retained in the Grampians, attain, when fattened, only 20 or 30 stones, will, when properly fed and housed in the lower districts, often acquire a carcase of 70 and 100 stone weight. The grazing and stall-feeding of cattle are prosecuted to a much greater extent than the rearing; large numbers being brought into the county to be fed and prepared for the butcher. Almost every herd consists of various breeds and crossings. A large proportion of the permanent stock are without horns. The colours most generally preferred are dark-brown, brindled, and black. Numerous cows of a good description are kept to supply milk for domestic consumption. One of the best will yield eight English gallons a day. The total number of cattle constituting the permanent stock of the county in 1813 was about 37,400, and their value 261,800*l.* Some large herds of fattened oxen are driven to Glasgow, and many are exported to Leith and London, when three or four years old.

The original sheep of this county, and apparently of the British isles, is the small white-faced breed. Some small flocks of these still remain in the Grampians, but generally they are much crossed with the black-faced breed of Tweeddale, which constitute a very large proportion of the whole stock of the county. Several superior and more delicate breeds are reared in the parks and lawns of the gentlemen's seats. Since the improvements in tillage, and the consequent extension of grain crops over the tracts of natural pasture, the keeping of sheep has become a secondary object, but nearly every farmer has a flock more or less numerous, and much improvement in breeding and rearing has lately been effected by the influence of several wealthy proprietors and the agricultural associations of the county. The total number in 1813 was about 60,000, and their value about 42,000*l.*

Hogs have recently become very numerous, and are kept by every farmer and cottager. There are two principal breeds; one, a thin-backed, raw-boned animal, with long bristles, a tapering snout, and projecting tusks, appears to be the descendant of the antient wild boar of the forest; the other is the small common Chinese breed, which is by far the most numerous.

The common kinds of domestic poultry and pigeons are generally kept by every farmer. A few bees are also very commonly kept, and produce excellent honey. Hares, rabbits, and partridges abound in the tracts of heather and less-frequented hedge-rows and coppices. Grouse and black-cocks are plentiful on the moors, and are much destroyed by wild-cats and foxes. Wild roebucks traverse the extensive plantations and glens of the Grampian and Sidlaw Hills. They are small and timid deer, but very untameable. No fence has been found sufficiently high to confine them, but they are often killed by sportsmen. In antient times, when the whole surface of the county was covered with impenetrable forests, extensive heaths and swamps, the red deer, or stag, abounded, especially among the Grampians, where it is now very rarely seen. The large antlers of the moose-deer are found in the mosses, together with enormous horns, supposed to belong to the Urus. The Alpine hare, whose fur in winter is snowy white, is found in the highest parts of the Grampians. The badger burrows in the woods and stony hill-sides, and its flesh is cured and eaten as bacon by some of the Highland peasants. The hedgehog is found among patches of low brushwood. Foxes are very numerous, and destructive to lambs, poultry, and game. The polecat often kills poultry. Weazels are tolerated by the farmers as destroyers of rats and mice, but they suck the eggs of poultry. To keep rats and mice out of corn-stacks, some farmers sprinkle several ounces of Scotch snuff among the sheaves at the time they are laid together.

Otters and seals frequent the rocks on the eastern sea-coast, and are occasionally taken by the fishermen. The woodcock appears in great numbers in October, and departs in March. Large flocks of wild geese and a few swans visit the county in November. The cuckoo and swallow appear in May and depart in October. Rooks are very numerous, and destructive to the newly-sown grain.

Great flocks of gulls, mews, and other sea-fowl alight on the ploughed lands adjacent to the coast, to feed on the vermin they find. The lofty Grampian rocks are frequented by large eagles, buzzards, kites, and hawks. Aquatic birds of innumerable kinds appear, especially in the winter months, on the lochs and the basin of Montrose. For a more particular account, we refer to a very copious list of the animals of this county given by Mr. Don in the 'Agricultural Survey.'

Fisheries.—The deep-sea fishing off the eastern coast is very productive, and large quantities of salmon and smaller fish are taken in the Frith of Tay, and at the mouths of several streams from thence to the North Esk. The villages of Ferryden and Usan, a little to the south of Montrose, are extensively engaged in the sea-fishery, which employs 700 persons, nearly the whole of their population. Above thirty boats, each carrying five or six men, are constantly going out from three to ten miles from land. In summer weather some go twenty miles eastward to fishing-banks, called the North and South Shold. From fifteen to twenty of these boats often come in together after an absence of twelve hours, each containing about a thousand haddocks, which are commonly sold in the market of Montrose for a farthing a pound. These two villages alone have supplied in one year to the fish-curers at Montrose above 46,000 cod and ling. They take also about two thousand barrels of herrings in one season, that is, from June to August. The value of the annual produce of this fishing station, which is only one of several on the same coast of this county, is estimated at 7400*l.* Large supplies of salmon are sent to the London market packed in boxes of pounded ice. The most abundant kinds of fish are salmon, cod, herrings, haddocks, turbots, sole, skate, sprats, smelts, lobsters, crabs, and muscles. With respect to fresh-water fish, the lochs and principal streams supply abundance of pike, perch, trout, and eels.

Commerce and Manufactures.—This county being bounded on the south by the Frith of Tay and on the east by the British ocean, is so favourably situated for commerce that a ready market for its agricultural and manufacturing produce can always be securely relied upon, and its exportations of linen fabrics, cattle, corn, and salmon are subjects of national interest; but as an account of the manufactures

and maritime trade carried on at its principal towns is given under the respective description of each [see under DUNDEE, and the sections of the present article relating to Montrose,] it is sufficient to mention here only a few general facts of commercial importance. There are two custom-houses in the county, one at Dundee and one at Montrose, which have jurisdiction over the port of Aberbrothwick, or as it is commonly called, Arbroath. The navigation of the Frith of Tay is much incommoded by a sand bar across the entrance and a great extent of shallow sands, which were the cause of numerous shipwrecks until the erection of two light-houses on the south-east extremities of the coast, one of which is moveable to admit of adaptation to the shifting of the cross bar. About 12 miles east of the Tay-mouth, and at about the same distance south-east from the port of Arbroath, is the dangerous reef, well known as the Bell Rock, a name derived from the fact that the monks of the antient abbey of Arbroath, to give timely warning to approaching vessels, fixed upon it a large bell which was rung by the motion of the waves. At low water of spring-tides this reef is seen extending 2000 feet by 230, the highest part being about 6 feet above the sea-level; but at high-water this part is 12 feet below the surface. In consequence of the dreadful storm in 1799, when 70 vessels were wrecked along this coast, it was determined to erect upon this reef a light-house similar to that on the Eddystone rock near Plymouth. The admirable edifice, completed accordingly by Mr. Stevenson, in 1810, at a cost of 55,000*l.*, is of a circular form, 113 feet in height. The lower part, from the base to the height of 30 feet, is entirely solid. The walls then commence 7 feet in thickness and diminish upwards. The diameter at the base is 42 feet. The lantern is of cast-iron, 12 feet in diameter, 15 feet high, and roofed with copper. The keeper's apartments, 50 feet above the base, are said to be as dry and comfortable as any house in Edinburgh, though, in stormy weather, the spray dashes up to the height of 90 feet. The shore on the Tay and thence nearly to Arbroath is low and sandy. Bold and precipitous rocks then overlook the sea as far as the lofty promontory of Red-head. In these high rocky cliffs are 20 deep and gloomy caves into which the waves at high-water enter with resounding echoes. The shore of the Lunan Bay is low and sandy; rocks then commence and terminate just beyond the South Esk, from whence sandy flats extend to the termination of the county at the mouth of the North Esk.

The total tonnage of the shipping belonging to the county amounted in 1813 to about 22,000 tons, but there has since been a very great increase. Seven or eight ships, each about 400 tons, are employed in the Greenland whale fishery. In 1832 the tonnage of vessels belonging to the port of Dundee alone was 32,868 tons, and the number of seamen employed about 3500; chiefly in the Riga, London, and coasting trade, and in the whale fishery. Ship-building is well executed at this port, and at the town of Montrose, which possesses at least 108 vessels, amounting to 11,000 tons register, and employed in similar trading. Arbroath employs in the same way about 50 vessels, each from 60 to 200 tons burden. Formerly this county exported large quantities of grain to Norway and Russia, but this department of trade is now chiefly confined to London, Leith, and Glasgow by the Clyde canal from the Forth.

The weaving of linen, which was the antient manufacture of Scotland, as were woollen cloths of England, was first introduced by the Flemings whom the Scottish kings encouraged to settle in their towns. The coarser kinds of linen fabrics, as huckabacks, canvass, sheeting, dowlas, sacking, &c., are manufactured in this county to a very large extent for exportation. Finer bleached linens for shirting and sheeting, and coloured thread, are also extensively manufactured, especially at Dundee. Mills for spinning flax into thread for weaving, moved by water and by steam, are established throughout the county; and on the banks of streams are many large bleaching-fields. About eleven million yards of linen fabrics are stamped annually, and the greatest part of this large produce of the county is exported. In weaving these fabrics men and women usually work five days in the week, and 15 hours a-day, earning, on an average from 1*s.* 6*d.* to 2*s.* a-day. In the spinning-mills the time of work is 5½ days in the week of 12 hours a-day, and the wages of men are also 1*s.* 6*d.* or 2*s.* a-day. Women in the mills earn 8*d.* or 10*d.* a-day, and children 4*d.* and 6*d.* The following observation is made by the Reverend author of the description of the parish of Kinnettles, in the 'New Statistical Account of Scotland.' 'Mill-spinning and weaving, from the long daily confinement, the imperfect ventilation of manufacturing houses, and the noxious flaxen dust inhaled into the lungs in respiration, seldom fail to produce bad effects on the constitution. They cause a pale emaciated countenance, with asthmatic and dropsical diseases. At the same time, by blending together many young persons of both sexes, a bad effect is produced on the morals of youth.' In addition to the above branches of manufacture might be mentioned several breweries, tanneries, distilleries, and various other establishments chiefly for supplying the common articles of domestic consumption. Shoes are made in large quantities for exportation.

The most noted fair for horses and cattle is held at Brechin in June. About 14 other fairs are held at the different towns throughout the county. The places and dates may be found stated in any of the Scotch calendars. Every town, and several of the larger villages, have weekly markets for domestic provisions and utensils, and for the various implements of agriculture and manufactures. (See descriptions of the towns of the county.)

There are 56 parishes, each of which is separately described in the 'New Statistical Account of Scotland.' The following five towns are royal burghs,—Forfar, Dundee, Montrose, Aberbrothwick, and Brechin. The county returns one member to parliament; one is returned for Dundee, and one jointly for the burghs of Montrose, Forfar, Brechin, and Aberbrothwick. The population of the county in 1831 was 139,606. The annual value of the real property at the same time was 361,241*l.*

Education.—Every parish is provided with a school-house and a schoolmaster, who resides in the same building, to which is attached a garden and sometimes a field for a cow. In Dundee an academy is established for teaching the foreign languages and the most useful departments of science; and in all the towns the parochial schoolmasters have classes for the elements of mathematics, mensuration, geography, astronomy, navigation, and drawing; besides the English, Latin, and French languages. The following remarks of the Rev. Mr. Headrick, in speaking of the schools of this county, are worthy of transcription:—'The establishment of parochial schools was carried by our zealous reformers, who strenuously impugned the maxim that "Ignorance is the mother of devotion." An approach towards public instruction was made by the bishops who established the first Scotch universities, but their object was to inculcate the nonsense of Aristotle's logic, in which the clergy might find weapons to defend their tenets against the attacks of heretics. It was our reformers who devised the plan by which the poor as well as the rich might be instructed. The parochial schools have diffused a taste for learning among the whole body of the people. Even the meanest cottager thinks it a sacred duty to have his children instructed in reading and writing, and many proceed to the higher degrees of education. Our Scottish aristocracy long looked with a jealous eye on the parochial schools, and foreboded the subversion of all order, and the extinction of all industry, from instructing the lower classes of society; but the fact has turned out to be the very reverse of their predictions; for since knowledge has been generally diffused the people have become much more orderly and industrious; agricultural improvements have advanced with unprecedented rapidity; great numbers of ingenious artists have been trained for every branch of manufacture; numerous improvements have been made in every species of machinery; well qualified persons have been abundantly found for naval and military service; and the numerous Scotchmen appointed to fill various public offices in the kingdom owe their promotion to the education they received at our parochial schools.' Lending libraries are numerous, not only in the larger towns, as Montrose, but in the villages. One of those in the parish of Craig contains 600 volumes. In the same parish a friendly society of fishermen has a fund of 500*l.*; and similar societies are established in many other parts of the county. Several savings' banks are also well appreciated and beneficially used by the labouring population.

According to the Parliamentary Return of 1818, there were in this county at that time 78 parochial schools, containing 3511 children, with a revenue of 2430*l.*; 148 day-schools, unendowed, were attended by 3905 scholars; and 79 sunday-schools, attended by 5302 children.

The poor are relieved by voluntary donations, church collections, and interest arising from funded legacies bequeathed by charitable persons.

Towns.—Besides DUNDEE the principal towns are ABERBROTHWICK, BRECHIN, FORFAR, Kirriemuir, and Montrose.

Montrose is a royal burgh and seaport, having separate jurisdiction. It is situated at the mouth of the South Esk river, between the large lake or basin of Montrose and the sea. In antient times it was a place of considerable strength, surrounded by walls. The site of the town and the adjacent northern shore are dry and sandy. One principal street, which is wide and regular, extends from north to south, and is crossed by several smaller streets and lanes. Many of the old houses present their gables to the street, as in the Flemish towns. Water is well supplied in pipes from the parish of Dun, three miles distant on the western side. The town is lighted with gas, and is well paved and cleansed. The river is crossed by a handsome chain suspension bridge, which was designed by Captain Brown, and cost above 20,000*l*. A pontage is levied amounting to about 1300*l*. a year. The church, in the middle of the town, is a large plain building capable of containing 3000 persons. A steeple, 200 feet in height, has been newly erected. An episcopal chapel, and a chapel of ease, are each commodious and neat places of worship; the same remark is applicable to several Dissenting chapels. There are three banking establishments, a custom-house, a town-house, prison, theatre, and post-office. The annual revenue of the latter is about 2000*l*. There are several religious and friendly societies, a savings' bank, a lunatic asylum, hospital, infirmary, and dispensary. Numerous bequests of benevolent persons form a poor's fund, amounting to 10,500*l*. Besides this, some large sums for the same purpose are derived from church collections, the hospital, and occasional donations. In a public academy are taught mathematics, arithmetic, Latin, Greek, French, geography, writing, history, &c. There are two free-schools, one for 42 boys and 35 girls; the other for 100 scholars of both sexes. A school established by the trades teaches writing and arithmetic to 240 children; an infant school instructs 130, and 20 private schools, male and female, are attended by about 700 children. The total number of children is 1634. Three public libraries are established, one of which contains 7000 volumes. The principal manufacture is flax-spinning and weaving. Four flax-mills in the town, moved by steam of 129 horse-power, produce annually 854,869 spindles of yarn. Three other large flax-mills on the river North Esk, belong to the town and parish of Montrose.

There are manufactories for soap, candles, starch, ropes, sails, and steam-machinery; besides five breweries, two tan-works, a foundry, and a steam flour-mill. Ship-building is well executed, and 108 vessels of 11,000 tons, belong to the port. The foreign import of flax in 1834 was 2500 tons, of whale-oil 400 tons, fir timber 1530 loads. The exports coastwise to London, Leith, and other ports, were—

Barley	23,700 qrs.
Oats	3,350
Wheat	1,430
Peas and beans . .	3,460
Potatoes	114,560 stones.
Salmon	1,890 boxes.
Cod	902 barrels.
Herrings	4,970 —

The harbour is formed by a breastwork at the mouth of the river, within which vessels of 400 tons can anchor, the water being 35 feet in depth at high tide, but no vessels enter the basin.

Lime, slates, flagstones, and numerous other articles are largely exported. Four regular traders sail to London, and two to Leith. There is a weekly market on Friday, at which corn is sold by sample, and all kinds of farm and garden produce. The population of the burgh in 1831 was 12,055, besides 900 sailors, but there has since been a considerable increase. James Graham, marquis of Montrose, the champion of the Covenant, was born in the town in 1612. Andrew Melville, the father of the Scottish Presbytery, was educated here; and here a Frenchman, named Marsilliers, first taught the Greek language in Scotland, in a private school, in the year 1534. In cutting a new street through an eminence called Fort Hill, on which an antient castle once stood, a stratum of human bones was discovered, nearly six feet in thickness.

Kirriemuir is an antient burgh of barony and market-town, situated five miles north-west of Forfar, on the edge of a mountain glen, overlooking the valley of Strathmore. It consists of several irregular but handsome streets, and has an elegant church and episcopal chapel, each with a spire, a town-hall, and several other public buildings of modern date. A weekly market is well supplied with provisions, and is numerously attended by the peasantry and farmers of the Grampian mountains. Coarse canvass and various other brown linens are manufactured very extensively. Three or four millions of yards are annually stamped, and several plash-mills and other machinery are established on the rivulet called the Gaire. There are several schools, one of which is endowed with 1700*l*. The population in 1831 was 5056.

Cupar-Angus, so called in contradistinction from Cupar, the county town of Fife, is a small neat market and post town, and a burgh of barony, on the Perth boundary line of the county, about eight miles south-west of Forfar. A magnificent Cistercian abbey, founded here in 1164, by Malcolm IV., on the site of a Roman camp formed by Agricola, still exists in ruins. Coarse linen fabrics are largely manufactured. There are also extensive bleaching-grounds, a large tannery, a well-endowed school, &c. Population in 1831, 2622.

Antiquities. Religious Buildings.—The first monastic churches and cathedrals in this and other counties in Scotland were erected on the sites of the religious schools and cells of the Celedes or Culdees, that is, the primitive Christians who having been banished beyond the Roman empire in the persecutions of the early emperors, sought refuge in these mountain wilds, where, on the revered spots already consecrated by the solemn rites of the Druids, they taught the doctrines and morality of the Christian gospel together with the sciences, so called, of that period. Their name is generally supposed to be derived from the fact of their living together in cells. When the Culdees, after a struggle for independence, gave place to the episcopal system, the abbeys and cathedrals at present still partially standing rose upon the ruins of their school establishments, and in the time of David II. a particular diocese with munificent endowments and revenues was conferred upon each of the bishops, who at first were not locally appointed, but exercised their pastoral functions as itinerants. A large portion of this county was included in the diocese of St. Andrews, and in that of Dunkeld. Brechin was the seat first of the Culdees, then of a bishopric of which the revenues were of great amount. On the edge of a deep ravine stands the part of Brechin cathedral which escaped the demolishing zeal of the Reformers. It is partly formed into a commodious parish church. Close by, and joined by a passage, stands one of the curious round towers, of which, though so common in Ireland, only one other specimen exists in Britain, namely, at Abernethey, in the county of Perth. The whole height is 103 feet, that is, 80 feet to the summit of the cylindrical column, and 23 feet from thence to the apex of an octagonal spire. The diameter of the base is 16 feet including the walls, and 12 feet at the top. In the contiguity of position to a church, in form and dimensions, and the appearance of great age, it corresponds to those in Ireland on which so much curious erudition has been expended. Next in dignity to the cathedral of Brechin, but far surpassing it in magnificence and extent, was the monastery of Aberbrothwick, of which the ruins stand on a lofty position overlooking the sea. Although great masses of the building are much defaced and falling, the remaining parts impress every beholder with surprise and religious awe. The church was cruciform, 275 feet by 67. The transept 165 feet by 27. A lofty spire stood in the centre, and two magnificent towers still partially remain. A massive building adjoining is supposed to be the baronial prison. This abbey was founded in 1178 by William the Lion, and was dedicated to Thomas à Becket. A very large proportion of the lands of this county once belonged to it, and it served all the purposes of modern hotels, in receiving every comer with the greatest hospitality and supplying all their wants—but without any charge. The Priory of Restennet, of which the remains are on the lake of this name, near the town of Forfar, was a place of great strength, accessible only by a drawbridge. Here the valuable effects and records of the monastery of Jedburgh were deposited for greater safety. Hence the appellation

Res tenet. The magnificent monastic church of Dundee has been elsewhere noticed. Many smaller monasteries stood in various other parts of the county.

Military Structures.—Of the antient vitrified forts, which occur in continuous chains along the heights of the northern parts of Scotland, there are three principal remains in this county. The fort, called the Castle of Finhaven, is on a hill of the same name in the parish of Oathlaw, 1500 feet above the surrounding country. It is quadrangular, 476 feet by 83 feet and 125 feet, and constructed on the edge of an elevated, detached, and precipitous rock. The remains of another of these forts is on the summit of a mount in Drumsturdy Muir, parish of Monyfieth. The third is on the top of the Law of Dundee, a remarkably high conical hill on the north of that town. On the remains of this vitrified fort are antient towers, ramparts, and outworks evidently superadded at some subsequent period. Much has been written by learned and scientific antiquaries on the origin and use of these remarkable structures. By some they have been believed to be the effect of volcanic eruptions. Others contend that they were the walls which surrounded the great beacon fires antiently lighted on mountain tops to alarm and assemble the people against the invading armies of their enemies, and that the vitrification of these large masses of stones was produced by the continued action of such prodigious fires. But the fact that these thick walls are found vitrified on the exterior as well as on their interior side, and often not in the middle, is one proof, besides many others, that the masonry was artificially reduced to a solid vitrified mass by a furnace heat applied for the purpose. The art of squaring stones and cementing them with lime-mortar appears to have been not known until after the Roman invasion. (Chalmers's *Caledonia; Vitrified Forts* in the *Encyc. Brit.;* Headrick's *Survey.*) Hill forts are the next in antiquity. Of these there are many in this county. The most important one is on the summit of a very steep conical hill in the parish of Menmuir, north-west of Brechin. The area of the fortress within the walls, which are of great thickness, is oval, 134 yards by 60. On a similar hill to the east, separated from this only by a deep ravine, is another of these forts formed entirely of earth. Two miles south-west of Glammis, on the Sidlaw Hills, there is one of a semicircular form with a wall 335 feet in circuit, 27 feet high, and 30 feet in thickness. On the hills of Dumbarrow, Caerbuddo, and several others, similar forts are partially remaining. They all contain vestiges of rude buildings formed of loose uncemented stones, and are sufficiently large to have held the inhabitants of the surrounding district and their cattle, which in times of danger were driven therein. They have each a well or excavated basin for collecting rain-water, and their situation is always on the top of an insulated and precipitous rock, or hill encircled with deep entrenchments. There are remains of several extensive Roman camps which formed a chain of military positions in a line from the south-west to the north-east sides of the county, including the towns of Forfar and Brechin. The Roman conquests were here first extended by Lollius Urbicus, in the reign of Antoninus Pius, A. D. 140. The encampment at Harefaulds, north of Caerbuddo, is replete with inner and outer works of stone and earth, and might contain an army of 60,000 men. Other similar camps occur in the parishes of Forfar, Brechin, and Oathlaw; the last encloses an area of 80 acres.

Of baronial castles erected during the prevalence of the feudal system there are several magnificent specimens in this county. At Broughty near Dundee are the remains of a very magnificent castle consisting of several massive towers and walls, standing on a rock which juts into the water of the Frith. The vaults of this castle are used for depositing the ice with which the salmon is packed for the London market. On the shore of Lunan Bay are the ruins of Red Castle, so called from being built of red sandstone. A large square tower and parts of extensive outworks are still standing. There are also remains of the Castle of Finhaven, a lofty quadrangular tower and parts of extensive fortifications. Edzel Castle, the Castle of Invermark, Kelly Castle, the Castle of Affleck, and several others present similar remains. Besides these there are numerous vestiges of less important baronial structures, consisting often of a single tower, now inhabited by some poor farmer or day-labourer. All these buildings indicate the great ferocity of antient manners. The lower rooms are vaulted with stone and lighted only by narrow loop-holes; small recesses in the massive walls served for dormitories, every entrance was secured with doors and bars of prodigious substance, and on the outer walls of some are iron spikes on which the baron hanged his prisoners, as at the Castle of Finhaven.

Two miles north-east of Forfar is a Druidical circle composed of stones 12 feet in height and 10 in breadth. Monumental stones with curious sculptures, and cairns containing coffins and urns, occur in various parts of the county. Near Cupar Angus is King Arthur's stone or monument, connected with a cairn which is traditionally said to contain the bones of this legendary prince. Glammis and Dunsinane in the neighbourhood are places of great interest, as mentioned in Shakspeare's tragedy of 'Macbeth,' where the hero says—

> 'By Sinel's death I know I'm Thane of Glammis.'

Here the usurper made his last stand against his pursuers, Macduff and young Seward, who came to restore Malcolm Canmore to the throne. On the hill of Dunsinane was the castle of Macbeth, from which he sallied when, in the words of the poet, he exclaimed,—

> 'I will not yield
> To kiss the ground before young Malcolm's feet,
> Though Birnam wood be come to Dunsinane,
> And those opposed be of no woman born.'
> —— 'Lay on, Macduff!
> And damned be he who first cries "Hold, enough!"'

Two mounds of earth, called Duff's Know and Bellie Duff, contain, it is said, the remains of Macduff and of his antagonist Macbeth. At Glammis is a large erect monumental stone commemorating by means of emblematical sculptures the assassination of King Malcolm II., whose murderers were drowned in escaping in the night across the frozen loch of Forfar. Many curious specimens of Caledonian, Druidical, Scandinavian, Roman, and monastic antiquities have been discovered in this county, as stone-coffins and urns in sepulchral cairns, battle-axes and other weapons, sculptured stones, coins, &c. In a tumulus opened in the parish of Logie Pert stone-coffins were found containing human skeletons of gigantic dimensions. On some of the uncultivated Grampian moors are vestiges of the antient Caledonian dwellings, consisting of large slab stones planted together in a circle without cement.

Houses of Proprietors.—Of these there are about seventy, many of which are distinguished for architectural magnificence and picturesque beauty of situation. The following are a few of the more important:—Glammis Castle, the residence of the earls of Strathmore, is a venerable castellated mansion, about a mile from this village. In the time of Charles II. it was a large quadrangular mass of buildings, with lofty towers and gateways opening beneath them into two spacious courts. Much of the original structure remains, and great additions were made of wings and turrets under the direction of Inigo Jones. The room is still shown in which King Malcolm II. was murdered in 1034. Brechin Castle, the spacious mansion of the Hon. W. Maule, was antiently a place of great strength, and stood a siege by Edward III. in 1303, during three weeks. Many additions to the old buildings were made by the earl of Panmure in 1711.

Panmure Hall, 10 miles north-east of Dundee, belonging to the nobleman of this name, is a large antient edifice, containing a fine collection of paintings. It is surrounded by an extensive park and stately plantations. Craigie Hall, two miles east from Dundee, is a handsome mansion, beautifully ornamented by tastefully disposed plantations. Kinnaird Castle, near Brechin, is one of the most elegant modern houses in the county. It is castellated, and from its turrets are seen a circuit of beautiful plantations and pleasure-grounds, and much distant and delightful scenery. Numerous other mansions of the nobility and gentry might be noticed; but for descriptions of them, as well as of many objects of antiquarian interest, which are only briefly named in the present article, reference must be made to some of the works enumerated below.

(Chalmers's *Caledonia;* the Rev. Robert Edwards's *Description of Angus,* 1678—1791; *Beauties of Scotland,* vol. iv. p. 342—375; Grose's *Antiquities of Scotland;* Chambers's *Picture of Scotland,* vol. ii.; *Geographical and Statistical Description of Scotland,* by Dr. Playfair, p. 421—458; Ainslie's *Map of Angus,* in 4 sheets, 1794; Col. Imrie's *Section of the Grampians;* Rev. W. Headrick's *Agricultural Survey of Forfar; New Statistical Account of Scotland;* MacCulloch's *Statistics; Parliamentary Reports, &c.*)

FORFEITURE, the punishment by loss of lands, estates, rights, offices, or personal effects, annexed by law to certain crimes, and also to certain illegal acts or negligence in the holder of lands or offices.

In criminal cases forfeiture is threefold:—1. Of real estates absolutely, as for high treason; if freehold, to the king; if copyhold, to the lord. 2. Of the profits of the real estate, if freehold, to the crown during the life of the offender, and a year and a day afterwards, in the case of petty treason or murder: [FELONY]; after which the land escheats to the lord [ESCHEAT]; if it is copyhold, it is at once forfeited to the lord. 3. Of goods and chattels, in felonies of all sorts. Some other cases of forfeiture of lands or goods, or both, are established by different statutes, as the statutes of premunire, &c.

Lands are forfeited upon attainder, and not before [ATTAINDER]: goods and chattels, upon conviction. The forfeiture of lands has relation to the time of the offence committed; the forfeiture of goods and chattels has not, and those only are forfeited which the offender has at the time of his conviction. A *bonâ fide* alienation of his goods and chattels made by a felon or traitor between the commission of the offence and his conviction, is therefore valid.

Forfeiture, in civil cases, takes place where a tenant of a limited, or, as it is called, a particular estate, grants a larger estate than his own, as where a tenant for life or years assumes to convey the fee-simple. So, if a copyholder commits waste, or refuses to do suit of court, or a lessee impugns the title of his lessor; for in all these cases there is a renunciation of the connexion and dependence, which constitute the tenure, and which are an implied condition annexed to every limited estate.

Forfeiture may also be the consequence of the breach of express conditions or covenants between landlord and tenant, or persons connected in tenure; but in cases of forfeiture where compensation can be made for the breach of the condition, a court of equity will compel the party entitled to the forfeiture to accept compensation. The right to take advantage of a forfeiture may also be waived by any act of the person entitled which recognizes the continuance of the title in the particular tenancy, as, for instance, the receipt of rent by a landlord in respect of a time subsequent to the act by which the forfeiture is incurred.

Lands may also be forfeited by alienation contrary to law, as by alienation in mortmain without licence, or to an alien: in the former instance, if the immediate lord of the fee, or the lord paramount, neglect to enter, the king may; and in the latter, though the conveyance is effectual, yet as an alien cannot hold lands the king may enter, upon office found. [OFFICE FOUND.]

Offices are forfeited by the neglect or misbehaviour of the holders; and the right to the next presentation to ecclesiastical benefices is forfeited by simony and by lapse. Simony is the corrupt presentation of any one to an ecclesiastical benefice for money, gift, or reward. Lapse is where the patron neglects to present to a benefice within six months after it has become vacant, in which case the right to present accrues to the ordinary; by neglect of the ordinary for the same space of time, to the metropolitan; and by the like neglect of the metropolitan, to the king. [BENEFICE.]

FORFICULIDÆ, a family of insects belonging to the order Orthoptera, and, according to some authors, constituting the order Dermaptera.

To this family belong the various species of earwigs. They are distinguished from the orthopterous insects (excepting the Blattæ and the Mantis tribe, which, with the Forficulæ, constitute Latreille's family *Cursoria*) by having the posterior legs formed for running: their wings, when folded, are almost always disposed horizontally on the body: the females have no corneous ovipositor; both sexes however are furnished with two corneous forcep-like appendages at the hinder extremity of the body: the antennæ are slender, filiform, inserted before the eyes, and vary considerably as to the number of their joints: the thorax is generally of a rounded form, and but slightly convex.

The family Forficulidæ is divided by Dr. Leach into three genera, the principal characters of which are taken from the number of joints to the antennæ. The first genus, that to which he restricted the name of *Forficula*, is distinguished by having fourteen joints to the antennæ. In the next genus (*Labidoura*) the antennæ have thirty joints; and in the last, the genus *Labia*, the antennæ are twelve-jointed.

To the first of these genera belongs our common earwig (*Forficula auricularia*, Linn.), an insect too well known to require a description.

Earwigs appear to prefer damp situations, are found under stones, and under the bark of trees, frequently in great abundance. They are also found in flowers, which they destroy by eating the leaves, &c.

A remarkable fact connected with the habits of the earwig is, that the female sits upon her eggs in the manner of the hen; and the young (which resemble the parent, except in being of a paler colour and having neither wings nor elytra), as soon as they are hatched, creep under the belly of the mother for protection.

The wings of the earwig are transparent, of large size, and when expanded are shaded like a fan; the principal nervures radiate from one point near the anterior margin. These organs, when not in use, are folded beneath two small horny wing-cases; and hence to the common observer the animal appears wingless.

The male and female common earwig differ considerably in their anal forceps, those of the female being less curved and destitute of a tooth-like process which is observed on the inner side at the base of the forceps of the male.

There is in this country another species of earwig, almost equally common with that we have just noticed, but which is of a much smaller size. It is found about hot-beds and dunghills, and differs from the common earwig somewhat in its habits as well as in its structure. This belongs to the genus Labia.

One species of the genus Labidoura is also found in England, but is of rare occurrence. It is of a much larger size than the common earwig.

FORGERY is the false making, counterfeiting, altering, or uttering any instrument or writing with a fraudulent intent, whereby another may be defrauded. The offence is complete by the making the forged instrument with a fraudulent intent though it be not published or uttered, and the publishing or uttering of the instrument, knowing it to be forged, is punished in the same manner as the making or counterfeiting.

It is by no means necessary to bring the offence within the legal meaning of the term forgery, that the name of any person should be counterfeited, though this is the most common mode in which the crime is committed; thus a man is guilty of forgery who antedates a deed for the purpose of defrauding other parties, though he signs his own name to the instrument; and the offence is equally complete, if a man being instructed to make the will of another, inserts provisions of his own authority. In truth the offence consists in the fraud and deceit.

At common law the crime of forgery was only a misdemeanour, but as the commerce of the country increased and paper credit became proportionally extended, many severe laws were enacted, which in most cases made the offence a capital felony.

The extreme severity of these laws tended to defeat their object, and parties very frequently chose rather quietly to sustain the loss inflicted upon them by the commission of the offence, than by a prosecution to subject the offender to the loss of life. This feeling, and the diffusion of the truth, that the object of all laws is to prevent crime and not merely to punish, has caused successive mitigations in the laws relating to forgery, and now by the statute 11 Geo. IV. and 1 W. IV. c. 66; 2 and 3 W. IV. c. 59, and 1 Vict. c. 84, the punishment of death is abolished in cases of forgery, and a punishment varying between transportation for life and imprisonment for two years, is substituted. (1. Hawk, P. C.; Russell *on Crime;* Deacon's *Criminal Law.*)

FORK (Anglo-Saxon *forc;* the same as the Latin *furca*), an instrument divided at the end into two or more prongs, for various uses, especially for the table. Addison speaks of a thunderbolt with three forks. It is sometimes used for an arrow, and in old English for a gallows or gibbet. Butler, in his 'Remains,' ii. 195, says, 'They had run through all punishments, and just 'scaped the *fork*.'

The agricultural, or dung-fork, and a large fork for the flesh-pot, were the only implements of this name apparently in use among our early ancestors. The first mention of table or eating forks is found in the 'Chronicon Placentinum' of John de Mussis (*Muratori*, vol. xvi. p. 584), a writer of the early part of the fifteenth century, who, when speaking of the luxuries of the people of Piacenza

recently introduced, says, 'they use cups, and spoons, and *little forks* of silver' ('et utuntur taciis, cugiariis, et *forcellis* argenti'). Coryate, in his 'Crudities,' edit. 1611, p. 90, announces himself as the person who introduced this Italian fashion into England. He says, 'Here I will mention a thing that might have been spoken of before, in discourse of the first Italian town. I observed a custom in all those Italian cities and towns through the which I passed, that is not used in any other country that I saw in my travels, neither do I think that any other nation of Christendom doth use it, but only Italy. The Italian, and also most strangers that are commorant in Italy, do always at their meals use a little fork when they cut their meat. For while with their knife, which they hold in one hand, they cut the meat out of the dish, they fasten their fork, which they hold in their other hand, upon the same dish, so that whatsoever he be that, sitting in the company of any others at meal, should unadvisedly touch the dish of meat with his fingers from which all at the table do cut, he will give occasion of offence unto the company, as having transgressed the laws of good manners, insomuch that for his error he shall be at the least brow-beaten, if not reprehended in words. This form of feeding, I understand, is generally used in all places of Italy, their forks being, for the most part, made of iron or steel, and some of silver, but those are used only by gentlemen. The reason of this their curiosity is, because the Italian cannot by any means endure to have his dish touched with fingers, seeing all men's fingers are not alike clean. Hereupon I myself thought good to imitate the Italian fashion by this forked cutting of meat, not only while I was in Italy, but also in Germany, and oftentimes in England since I came home: being once equipped for that frequent using of my fork, by a certain learned gentleman, a familiar friend of mine, one M. Laurence Whitaker, who, in his merry humour, doubted not to call me at table *furcifer*, only for using a fork at feeding, but for no other cause.' Coryate's testimony is confirmed by Fynes Morison, in his 'Itinerary,' P. i. p. 208, fol., 1617, who, speaking of his bargain with the patron of the vessel which conveyed him from Venice to Constantinople, says, 'he gave us good diet, serving each man with his knife, a spoon, and a fork.' (See also Ben Jonson's *The Divell is an Asse*, act v. sc. 3; and his *Volpone*, act iv. sc. 1.)

Even when Heylin published his 'Cosmography,' in 1652, forks for the table were still a novelty (see his third book); where, having spoken of the ivory sticks used by the Chinese, he adds, 'the use of silver forks with us by some of our spruce gallants taken up of late, came from hence into Italy, and from thence into England.'

FORLI', LEGAZIONE DI, a province of the papal state, is bounded on the north by the province of Ravenna, on the west by Tuscany, on the south by the province of Pesaro ed Urbino, and on the east by the Adriatic. Its area is reckoned at 1232 square miles, with a population of 188,000 inhabitants, distributed in 8 towns, 32 terre having a communal council, and 404 villages or hamlets. (Calindri; Neigebaur.) The province is watered by the Rabbi, Ronco, Savio, Marecchia, and other rivers which have their sources in the Tuscan Apennines and empty themselves into the Adriatic. The country is in part hilly, being occupied by offsets from the Apennine chain, which extend towards the Adriatic; the climate is healthier than that of the neighbouring flats of Ravenna. The principal productions are corn, oil, wine, flax, hemp, fruits, and silk. There are manufactories of silk, linen, and oil-cloth, and refineries of sulphur, which is found in the province. The chief towns are—1. Forlì, the antient Forum Livii, which is said to have been built after the victory of the Metaurus, and to have taken its name from M. Livius Salinator, one of the two consuls who defeated Hasdrubal. The present town is well built: the streets are lined with arcades. It has a fine square, several handsome palaces and churches with paintings by Carlo Maratti, Guido, Guercino, Cignani, and other masters, a Lyceum, and fine public walks. Forlì is a bishop's see and the residence of the legate. The population of Forlì is 14,700. 2. Cesena, a pretty town in a fertile country near the foot of the Apennines, watered by the river Savio, over which is a fine bridge, has a handsome town-house on the market-place, which is adorned by a colossal statue of Pius VII. (Chiaramonti), who, as well as his predecessor, Pius VI., was a native of this town. Cesena is a bishop's see, has a college for clerical students, and a valuable public library, collected by the Malatesti, who were lords of Romagna in the Middle Ages: it is rich in MSS., among which is a curious work of St. Isidorus, bishop of Seville, in the seventh century, entitled 'Etymologiæ,' which is a kind of cyclopædia. (Valéry, *Voyages Littéraires en Italie*.) The population of Cesena is 9500. On a hill outside of the town is the Benedictine convent of La Madonna del Monte, the work of Bramante. 3. Half way between Forlì and Cesena is the little town of Forlimpopoli, the antient Forum Popilii, with a collegiate church, a castle, built by Cesare Borgia, and about 2000 inhabitants. 4. Savignano, on the road from Cesena to Rimini, near the site of the antient Compitum, has some good buildings and about 3000 inhabitants. Near Savignano flows a small river, called Fiumicino, which is now generally believed to be the antient Rubicon: it joins, below Savignano, another stream, called Pisatello, which flows nearer to Cesena, after which the united stream enters the Adriatic. A Roman bridge is thrown across the Fiumicino. Near it, on a pillar, is an apocryphal inscription, (which has been mistaken by some for an antient one,) containing the senatûs consultum, which forbade, under the heaviest penalties, any commander to cross the Rubicon in arms. 5. Rimini, the Roman Ariminum, a considerable town with 13,450 inhabitants, situated near the mouth of the river Marecchia, which is crossed by a handsome marble bridge of five arches and 220 feet long, begun under Augustus and finished under Tiberius, and still in very good preservation. The sea having receded all along this coast, the antient harbour of Ariminum is now choked up with sand; but there is a small harbour at the mouth of the Marecchia which admits vessels of light burden, by which Rimini carries on some trade by sea. At the eastern entrance of the town, on the road to Rome, is a fine triumphal arch, raised to Augustus [ARCH, TRIUMPHAL], of which an elaborate description has been recently published—*Illustrazione dell' Arco di Augusto, con otto Tavole di Rome*, by the Engineer Brighenti; Rimini, 1825. There are also some remains of an amphitheatre, besides inscriptions and other marbles found on the site of the antient harbour. Rimini, with its Roman monuments, appears a fit entrance into the limits of the classical part of Italy. Among the modern buildings is the church of St. Francis, which Leon Battista Alberti raised by order of the Malatesti, lords of Rimini, and which is adorned with the mausolea of that distinguished family of the Middle Ages; and the fortress, which was also erected by the Malatesti. Rimini has a good library of 30,000 volumes, founded in 1617 by the advocate Alessandro Gambalunga, and which contains MSS. chiefly concerning the history of the town, and a museum of antiquities and a college or Lyceum. 6. Sarsina, at the foot of the Apennines, south-west of Rimini, an antient city of the Umbri, and the birthplace of Plautus, is now a decayed town surrounded by walls, with only 325 inhabitants. 7. Cesenatico, on the sea-coast, north-east of Cesena, in a plain abounding with wheat, Indian corn, and hemp, has 4440 inhabitants, including its territory.

The province of Forlì is one of the finest and richest in the papal state; and the road from Rimini to Bologna is one of the pleasantest in Italy, leading through a succession of neat, considerable, and cheerful-looking towns, in a fine well-cultivated country, with a landscape heightened by a constant view of the Apennines of Tuscany.

FORM. Everything that exists may collectively be termed the 'something,' in opposition to the 'nothing.' This 'something' divides itself into four great divisions, namely things, ideas, forms, and appearances. Form is the manner and mode in which a thing is presented to our conceptions. Things are of two descriptions: immaterial, as faculties and intellect; and material, as matter and bodies. The forms of the immaterial things are called categories; the forms of the material we may call figures; the form of appearances retains the name of form; and ideas are formless. The categories, according to the opinion of the writer (founded upon those of Aristotle, Kant, and many others), are the following:—1. Categories of position,—to be, not to be, and to become; 2. Categories of quality,—substance, accident, and mode; 3. Categories of relation,—cause, effect, and action and reaction; 4. Categories of quantity,—universality, multiplicity, and unity. The logical categories are possibility, actuality, and necessity. [CATEGORY.] The figures, on account of their variety, do not admit of being classified, yet we may

divide them according to the senses, into shapes, colours, sounds, smells, and tastes, and into the different modes of feeling

Form is distinguished from the real nature of things, and, considered in this point of view, the idea of form is practically used in common speech and in science. Thus we speak of a form of law, a form of government, a beautiful form, a logical form, &c. Whoever esteems the form of anything more highly than the thing itself, or through narrow-mindedness confounds the one with the other, is a formalist, as many learned men and official persons are.

FORMA PAU'PERIS. By the statute 11 Hen. VII. c. 12, every poor person having cause of action or suit shall have, by the discretion of the chancellor, original writs or subpœnas, without paying for writing or sealing the same; and the judges of all courts of record, where such suit shall be carried on, are authorised to assign clerks to write, and counsel and attorney to act for such person, without taking any reward. It is discretionary with the court to grant this indulgence, but it is rarely refused upon petition, supported by affidavit that the petitioner is not worth 5*l.* in the world after paying his just debts, exclusive of his wearing apparel, and the right to the matter in controversy, and by a certificate by a barrister that he has good cause of action or suit. This statute extends only to plaintiffs in civil suits at law, but the courts of common law have a discretionary power to allow a party indicted to defend as a pauper, though without special cause shown the advantage is never given to a prosecutor. The Court of Chancery, to which the statute 11 Henry VII. does not apply, has, from an early period, permitted parties to sue and defend as paupers upon the same conditions as the courts of law, though in that court, it seems, if the party be in possession of the subject matter in dispute, and that should be worth more than five pounds, he cannot except it in his affidavit, and therefore will not be regarded as a pauper. The privilege may be granted either at the commencement of the suit, or at any period of its progress, but if granted during the pendency of the suit, it has no retrospective effect, and the party is not relieved from the costs previously incurred.

A person allowed to sue *in formâ pauperis* pays neither for stamps, nor fees, to the officers of the court, but if he obtains a verdict with damages above 5*l.*, the officers take the fees. In case of improper or vexatious conduct on the part of the pauper, the courts will sometimes, though rarely, deprive him of the privilege, which is called dispaupering him; but it seems that in such cases a pauper plaintiff is never ordered to pay costs to the defendant, though, according to Blackstone, a pauper, if non-suited in his action, formerly had his election either to be whipped or pay costs. (3 Bl. *Com.* 400; and the various books of practice relating to costs in equity and at law.)

FORMEDON (a compound of the two Latin words *forma doni*), one of the many writs in use under the old law for commencing a real action before the more convenient mode of trying titles to land by ejectment was established. [EJECTMENT.] It was the peculiar remedy of a tenant in tail, and the highest he could have, and was therefore called tenant in tail's writ of right. The writ of right was granted to such only as claimed the fee simple, for which reason the statute *De Donis* (Westm. 2. 13 Ed. I.) gave this writ to tenants in tail.

The writ was of three kinds; formedon in the descender, in the remainder, and in the reverter, according as the plaintiff alleged his title to have accrued by descent, in remainder, or in reversion. This writ, together with all the others used for the commencement of real actions, was abolished by 3 and 4 Will. IV. c. 27, s. 36.

FORMENTE'RA. [BALEARIC ISLANDS.]

FORMIC ACID, or acid of ants. When these insects are irritated they emit a sour fluid which contains both formic and malic acids; and when repeated quantities of ants have been infused in boiling water, an acid as strong as vinegar is obtained, and has been used for the same purposes. In order to procure formic acid, Gehlen saturated this acid liquor by adding carbonate of potash, precipitating the foreign matters by sulphate of iron, evaporating the solution to dryness, and distilling the residue with sulphuric acid, by which formic acid comes over and is condensed in the receiver, and sulphate of potash remains in the retort.

It has been since shown by Dœbereiner that formic acid may be prepared artificially: he heated in a retort 5 parts of sulphuric acid diluted with 15 of water, with 2 parts of crystallized tartaric acid and 3 of binoxide of manganese by the mutual action of these substances carbonic acid is obtained, which escapes in the gaseous state, and dilute formic acid is condensed in the receiver: this dilute acid is to be saturated with potash, and the resulting formiate, when decomposed by sulphuric acid, yields concentrated formic acid. Professor Emmet (*Lond. and Edin. Phil. Mag.* vol. xi. p. 399,) has shown that formic acid may be obtained by the action of sulphuric acid and water upon rye or maize, when heated to the boiling point, with precautions mentioned.

The properties of formic acid are, that it is a colourless liquid; its smell is pungent, and its taste very acid; its specific gravity is 1·1168, and, when anhydrous, it consists of

One equivalent	of hydrogen	1
Two ,,	of carbon	12
Three ,,	of oxygen	24
	Equivalent	37

These elements are equal to 1 equivalent of water and 2 equivalents of oxide of carbon, and by the action of sulphuric acid it is resolved into these compounds.

Concentrated formic acid contains 19⅝ per cent. of water: among other peculiarities of formic acid, serving to show that it is different in properties from acetic acid, are the effects which it produces in not precipitating protoxide of mercury from solution as acetic acid does, unless heated, and then metallic mercury is thrown down, with brisk effervescence. Oxide of lead is precipitated from a solution of the acetate by this acid.

The only use to which formic acid is applied has been mentioned. Its saline compounds are termed formiates; and although these are subjects of some curiosity, no one of them is used so as to require a particular description.

FORMIC ÆTHER may be obtained by distilling a mixture of formic acid and alcohol; but it is much better procured by distilling a mixture of 10 parts of concentrated sulphuric acid, 7 of formiate of soda, and 6 of alcohol. The distilled product should be mixed with water to separate the alcohol which it contains, then agitated with magnesia to saturate any excess of acid, and lastly, freed from water by distillation with chloride of calcium. This is Dobereiner's process.

Formic æther is a colourless liquid, of a strong odour resembling that of peach kernels: its taste is peculiar. Its specific gravity is 0·915 at 65°, and it boils at 132° Fahr. It combines with alcohol in all proportions; but water unites with only ⅑th of its weight; and after some time the solution is found to be converted into a mixture of alcohol and weak formic acid: this æther burns in the air with a blue flame, the edges and point of which are of a bright yellow. This æther has not yet been analyzed, but Dr. Thomson, judging from analogy, thinks it is probably a compound one equivalent of formic acid and one of æther.

FORMOSA. [TAÏ-WAN.]

FORMO'SA, RIO, a river in Africa, falling into the Bay of Benin, is also sometimes called Benin, from traversing the kingdom of that name. Its mouth, which alone is known to Europeans, is in about 5° 46′ N. lat. and 5° 5′ E. long. It traverses a flat alluvial country. Lander, in his descent of the Quorra, was told by the natives that the considerable branch which at the town of Kirree turns off to the westward runs down to Benin. Hence it is conjectured that the Rio Formosa is only the most northern of the branches, into which the Quorra divides after entering its extensive delta.

FORMO'SUS, Bishop of Porto, was raised to the see of Rome, A.D. 891, after the death of Stephen V. He had acquired a reputation for learning and piety, but being in opposition to John VIII., in the matter of the election of a new emperor, that pope had deposed him in 878, but Martin II., John's successor, honourably re-instated him in his see. His conduct, after his exaltation to the papal see, was both firm and moderate, as is shown by his letters relative to the schism of Photius, as well as by those which he wrote to Eudes, the competitor of Charles the Simple, and to the bishops of Gaul, exhorting them not to disturb Charles in the possession of the crown. In one instance, however, he has been accused of tergiversation. In February, 892, he crowned Lambert, son of Guido, as colleague to his father in the kingdom of Italy, but soon after, in consequence of disputes between Guido and the

Roman see, Formosus wrote to Arnulph, king of Germany, inviting him to come to Italy and assume the crown. Arnulph came to Italy and was crowned at Rome by Formosus in the beginning of the year 895, after the death of Guido. The history of that period and of the various competitors to the crown of Italy is extremely confused. Formosus died in April, 895, and was succeeded by Boniface VI., who, dying a few days after, was succeeded by Stephen VI., by some styled the VII., who having taken the part of Lambert against Arnulph, instituted proceedings in a council against the memory of Formosus, and had his body disinterred. Romanus however, who succeeded Stephen, in a council held at Rome, in 898, rescued the character of Formosus from this stigma, had his body honourably buried again, and declared the acts of his pontificate to be legal and valid.

FORNAX (Constellation), the Chemist's Furnace, one of the southern constellations of Lacaille. It is situated immediately below Cetus.

Character.	No. in Catalogue of		Magnitude.
	Piazzi (). Lacaille C.	Astron. Soc.	
κ	(73)	246	6
	(107)	260	6
τ	(114)	396	6
ω	(122)	267	6
δ	(142)	408	5
σ	(169)	420	6
υ	(194)	305	5
β	(195)	306	5
γ^1	(198)	309	6
ζ	(241)	327	6
ε	(248)	333	6
ο	(267)	347	6
	233 C	337	6

FORSKAL, PETER, a celebrated naturalist and oriental traveller, was born in Sweden, in the year 1736. After studying at Göttingen, where he published a dissertation under the title of 'Dubia de Principiis Philosophiæ recentioris,' by which he gained some credit, he returned to his native country. In 1759 he wrote his 'Pensées sur la Liberté Civile,' a pamphlet which did not prove agreeable to the ruling powers of Sweden. A fondness for natural history had brought him acquainted with Linnæus, then at the zenith of his fame, by whom he was favourably recommended to Frederick V., king of Denmark. In 1761 he obtained the title of professor at Copenhagen, and having been distinguished for his acquaintance with oriental languages, he was selected to join Niebuhr and others in an expedition to investigate Egypt and Arabia. After visiting Marseilles, Malta, some of the Greek islands, and Constantinople, he arrived at Alexandria. For about a year he remained stationary in Cairo and its vicinity; he afterwards visited Suez, and entering Arabia by Loheia, he penetrated by way of Beit el Fakih and Zebid as far as Mocha; thence crossing the mountains to Taas and Abb, he eventually and with difficulty reached Jerim, where he died on the 11th of July, 1763. In the course of this journey, although robbed and ill-treated by thieves near Alexandria and elsewhere, suffering from constitutional timidity, and often bowed down with sickness, he investigated with such extraordinary energy and perseverance the natural productions, especially the plants, of the places he visited, that although he never lived to arrange his papers, the account of the vegetation of Egypt and Arabia, compiled after the return of his companions to Europe, is a model of the manner in which such investigations should be conducted. From his friend and companion Niebuhr, to whom the care of editing Forskal's MSS. was intrusted, we have a 'Fauna Orientalis,' under the title of 'Descriptiones Animalium, Avium, Amphibiorum, Piscium, Insectorum, Vermium, quæ in itin. orient. observavit Petrus Forskal,' 1775, 4to.; and in the same year and form appeared a 'Flora Ægyptiaco-Arabica,' or an account of the plants found in Lower Egypt and Arabia Felix. This latter work is very remarkable, as an illustration of the philosophical mind of Forskal, and is far in advance of the works of a similar kind published by the followers of Linnæus. It is one of the first books in which the relation of vegetation to climate is taken as a great object of consideration, and may in fact be quoted as one of the earliest steps made in geographical botany. We here find an attempt to show the existence of geographical parallels of vegetation, and the remarkable assertion that, 'Given the specimens of plants, you may find the latitude of a country, the elevation of its surface, and the zones of vegetation upon its mountains, from their foot to their highest peaks.' The 'Flora Ægyptiaco-Arabica' is to this day the only good account we have of the plants of those countries, and it may be even doubted whether we have upon the whole so satisfactory a view of the vegetation of any extra-European region. We have 'Floras' with more systematic learning; we have works much more complete in their details, more technical, more laboured, more diffuse, prepared with all the advantages of leisure, experience, and the resources of rich herbaria; but if the botanist is asked to point out one as philosophical, as well contrived, as useful, as rich in valuable observations upon climate, air, soil, native names, and similar important matters, we know not to what other he could refer. Linnæus fixed the name of Forskal to his own Caidbeja adhærens, a worthless Arabian weed, under the title of F. tenacissima; but we are assured by a panegyrist of the great Swedish botanist, that in doing so he intended to compliment rather than satirize the character of his unfortunate countryman.

FORSTER, JOHN REINHOLD, was born in 1729, at Dirschau in Western Prussia, of which town his father was burgomaster. Having studied at Halle, he was appointed in 1753 to the cure of Vassenhoff near Danzig. In 1765 he accepted an offer to go to Russia to take the direction of the new colony established by Catherine at Saratof; but he soon left it in disappointment, and proceeded to England in 1766, where he became known to Mr. Banks and others for his acquirements in natural history. During his residence in England he employed himself for some years as teacher in a Dissenters' school at Warrington in Lancashire. Through Mr. Banks's interest he was appointed naturalist to the second expedition under Captain Cook, and he sailed, together with his son George, on board the Resolution, in July 1772. A sum of 4000*l.* was granted by parliament for his expenses, besides which it was verbally understood between him and the Honourable Daines Barrington, in the name of Lord Sandwich, that Forster should be employed on his return to write the history of the voyage, and receive the profits of the publication. In the course of the voyage repeated disagreements took place between Forster and the officers of the expedition, and Captain Cook himself appears to have censured Forster's indiscretion and want of temper. After the return of the expedition in July 1774, a controversy arose between Forster and Lord Sandwich about writing the narrative of the voyage. It was at last settled that Forster should write the philosophical, and Cook the nautical parts of the work. Forster's MSS. were to be subject to Barrington's correction; but on presenting a specimen of his intended work, he was told that he must not write a connected narrative but only detached observations, and ultimately even these were rejected. The consequence was that Cook's journal appeared alone. Meantime Forster, the son, published a separate account of the voyage in 1777; a circumstance which indisposed the Admiralty still more towards his father, who was believed to have had the principal share in the work, and who thus lost all hopes that he might have entertained of remuneration. Forster's account of the transactions is given in the letters of his son George to Lord Sandwich, and to Mr. Wales, who had written strictures on Forster's narrative. In 1778 Forster returned to Germany, and was well received at Berlin by Frederic the Great, and was soon after made professor of natural history and mineralogy at Halle, where he remained till his death, in December, 1798.

Forster was a man of vast information both in the natural sciences and in philosophy, and general literature. His principal works are:—1. 'De Bysso Antiquorum, 1775;' 2. 'Characteres Generum Plantarum quas in insulis Maris Australis collegit J. R. Forster,' 4to., 1776; 3. 'Observations faites dans un Voyage autour du Monde, sur la Géographie physique, l'Histoire Naturelle, et la Philosophie Morale,' 4to. 1778. This work was translated into various languages, and forms a good supplement to Cook's journal, although the tone of Forster's observations is not always in

accordance with sound criticism. 4. 'Zoologia Indica,' 1781; 5. 'Histoire des Découvertes et Voyages faits dans le Nord, 1784;' 6, 'Tableau de l'Angleterre pour l'année 1780,' a satirical work written under the influence of disappointment and animosity, and consequently with little discrimination.

FORSTER, JOHN GEORGE, son of John Reinhold Forster, accompanied his father in the voyage with Captain Cook, and published an account of the same in 1777, which involved him and his father in an unpleasant controversy. This narrative does not differ materially in the facts from Cook's journal. Forster however has added to his work various observations, which he considered as philosophical, but which are often only declamatory. His book was translated into German, French, Swedish, and other languages. Forster having returned to the Continent, was made professor of natural history at Cassel, and afterwards at Wilna, from which last place he returned to Germany about 1788, and was appointed librarian to the elector of Mayence. After the French took Mayence in 1792, Forster, who had become enthusiastic in the cause of the Revolution, was chosen by the republicans of that city to proceed to Paris, as their representative, to request the incorporation of Mayence with the French republic. While he was at Paris on this mission, the Prussians re-took Mayence, and Forster lost all his property, including his books and MSS. This loss, and other domestic disappointments, made him resolve on leaving Europe, and he planned a journey to India and Tibet, preparatory to which he applied himself to the study of the Oriental languages; but he fell ill soon after, and died in January, 1794. He left several works; among others, 'Ansichten von Nieder Rhein, von Brabant, Flanders, Holland, England, und Frankreich in 1790,' in three parts, of which the last was published after his death, Berlin, 1794. This work was translated into French under the title of 'Voyage Philosophique et Pittoresque sur les Rives du Rhin, &c.,' 3 vols. 8vo., Paris, 1795-6. The last volume contains an essay on the history of the fine arts in Great Britain. Forster wrote also 'Herbarium Australe,' several memoirs on natural history, and various political and philosophical sketches and pamphlets.

FORSTER, GEORGE, a civil officer in the service of the East India Company, is chiefly known by his journey in 1782 over-land from India to Russia. He set off from Lucknow in December, 1782, and directed his route to the north by Ferahabad, Rampoor, and by the pass of Lall Dong into the upper regions of the Punjab, avoiding the country of Lahore, which was possessed by the Seiks. He then proceeded by Bellaspoor and Jombo into the great alpine valley of Cashmere, which had not been visited by any European travellers before him, Bernier excepted. Forster's account however proved much more full and satisfactory than that of Bernier. Quitting Cashmere, Forster proceeded to Cabul, crossing the Indus about twenty miles above Attock. From Cabul he followed the caravan road to Candahar, and thence by Herat to the southern coast of the Caspian Sea. From Oude to the Caspian he was nearly twelve months on his journey, the distance being 2700 miles, amidst all sorts of dangers and privations, which were much greater at that time than they would be at present. He embarked at last at Meshed Ser on the Caspian, and sailed from thence to Baku and Astrakan, from which last place he travelled to Moscow and Petersburg, where he arrived at the end of May, 1784. On his arrival in England he published some sketches of Hindoo mythology. He afterwards returned to India, and published in 1790 at Calcutta the first volume of his narrative—Journey from Bengal to England through the most northern parts of India, Kashmere, Afghanistan, and Persia, and into Russia by the Caspian Sea.' On the commencement of hostilities with Tippoo Sultan, Forster was sent as envoy to the Mahratta court of Nagpore in Deccan, where he died in 1792. The MS. of the sequel of his journey was sent to England, where it was published by a bookseller in a second volume, but was edited without much care. The whole work was translated into French by Langlès: 'Voyage de Bengale à Petersburg,' 3 vols. 8vo., Paris, 1802. Forster added to his narrative two interesting notices of the Seiks and the Rohillas.

FORSTERITE, a crystallized mineral, the primary form of which is a right rhombic prism. The crystals are colourless, translucent, brilliant, and small; they are harder than quartz. This substance occurs at Vesuvius accompanied by pleonaste and pyroxene. It has not been accurately analyzed, but contains silica and magnesia.

FORT, LE. [LEFORT.]

FORT ROYAL. [MARTINIQUE.]

FORTE (Italian *strong, loud*), a musical term, directing the performer to sing or play loudly, with strength.

Fortissimo is the superlative of *Forte*.

FORTESCUE, SIR JOHN, KNT., an eminent lawyer, lord chief justice of England in the reign of Henry VI., and afterwards chancellor. He was the author of a treatise 'De Laudibus Legum Angliæ;' a work which has been several times quoted with the highest approbation from the bench, illustrated by the notes of Selden, and recommended by such writers as St. German and Sir Walter Raleigh, in former times, and by every writer who has since given directions for the study of the law. It has been several times translated into English. It is in the form of a dialogue between himself and the young prince Edward, with whose education he appears to have been intrusted. The author undertakes to show that the common law was the most reasonable and the most antient in Europe, and superior to the civil law and the laws of other countries. He considers at length, in particular, the mode of trial by jury; and after examining some other points of difference between the civil and the common law, he concludes with a short account of the societies where the law of England was studied. This book, as well as the other works relating to English law of an early date, is written in a bold style, and displays many sentiments upon liberty and good government, which are very remarkable, considering the fierce and barbarous period at which they were written. 'We cannot,' says Chancellor Kent, 'but pause and admire a system of jurisprudence which in so uncultivated a period of society, contained such singular and invaluable provisions in favour of life, liberty, and property as those to which Fortescue referred. They were unprecedented in all Greek and Roman antiquity, and being preserved in some tolerable degree of freshness and vigour amidst the profound ignorance and licentious spirit of the feudal ages, they justly entitle the common law to a share of that constant and vivid eulogy which the English lawyers have always liberally bestowed upon their municipal institutions.' The English translation of the treatise 'De Laudibus Legum Angliæ,' and the original Latin text, together with some notes by Mr. Amos, were published in 1825 at the expense of the University of Cambridge. (Kent's *Comms.*; Reeve's *Hist. Eng. Law.*)

FORTH, a river in Scotland, which rises in the mountains separating the western extremity of Loch Cateran or Katrine from Loch Lomond. It is formed by two branches, which after a course of sixteen and twelve miles respectively, unite at Aberfoyle: this united river receives the name of Forth. At Aberfoyle the river issuing from between the mountains, enters a wide valley, which is surrounded by hills rising to a moderate elevation and generally with a gentle slope. From the north it is joined by three tributaries of some note, the Teith, which drains the mountainous country north of Loch Cateran, the Allan, which runs through Strathmore, and the Devon, which brings down the water collected in the greater portion of the Ochill Hills. No considerable river joins it from the south. At the place where it unites with the Devon, the river, which higher up is only a stream of moderate size, begins to widen, and gradually assumes the appearance of a gulf, especially after having passed Kincardine. This gulf, called the Frith of Forth, increases in width in its progress to the east, and joins the North Sea between Fifeness and the rocks of Tantallan Castle, where it is about fifteen miles across. The source of the Forth is not much more than thirty miles from the mouth of the Devon in a straight line, but as it flows in the valley with many sinuosities, its real course is stated to exceed considerably twice that length. The length of the Frith from west to east rather exceeds fifty miles. The Forth is by no means a rapid river below Aberfoyle, and may be navigated by vessels of seventy tons burden as far as Stirling; but as its course is extremely tortuous between Stirling and Alloa, it is not much navigated in this part. To Alloa, which may be regarded as its principal port, ships of 300 tons burden may ascend. On the southern shores of the firth, near the mouth of the river Carron at Grangemouth, the canal commences, which joins the Forth and the Clyde; and contiguous to it on the east, between Grangemouth and Queensferry, is good and

secure anchoring ground in the bay. The countries along the northern and southern shores of the Frith comprehend the most fertile and best cultivated parts of Scotland. (MacCulloch's *Highlands, &c.*; Sinclair's *Stat. Account.*)

FORTIFICATION is the art of constructing works for the protection of a town or military position.

The principles which regulate the general plan of the works constituting the fortifications of a town or great military post, have at all times been nearly the same. Among the antients, with scarcely any exception, the polygonal wall surrounding a place was provided with towers projecting from it at intervals towards the front; and a barbacan, or outwork, consisting of two or more towers, connected by walls like those of the fortress itself, was generally constructed on the exterior side of the ditch and opposite a gate of the town, in order to protect that entrance and the bridge leading to it. The towers and walls about an antient town correspond to the bastions and curtains forming the enceinte of a modern fortress, and the barbacan may be considered as the counterpart of its ravelin, or principal outwork.

The necessity which the nations of Europe were under of remodelling their fortified towns in consequence of the change produced in the art of war by the invention of gunpowder, gave occasions for the engineers of Italy, France, and the Netherlands to emulate each other in devising the most advantageous methods of disposing the works for the purposes of defence with relation to the arms then newly introduced; and the result of their labours was the construction of numerous strong fortresses on the frontiers of those countries. In these the bastion system, as it is called, was invariably adopted, and it is remarkable that, of the very numerous projects which have been since offered to the world for fortifying places, so few should have been of a different kind. The variations however which occurred in the details of the plans gave rise to the denominations of the Italian, the French, the Spanish, and the Dutch methods, in speaking of the works proposed or executed at the end of the sixteenth and the beginning of the seventeenth centuries; but it must be observed that those variations consisted chiefly in the magnitude of the angle which the two faces of a bastion made with each other, and in the extent of what was called the second flank; that is, the portion of the curtain then generally left between the flank of a bastion and the place where the produced face of the collateral bastion intersected the curtain.

The first bastioned fortresses of France appear to have been very inferior to those which were executed in the Netherlands by the Italian engineers; and there still exist some remains of these last in which the bastions are sufficiently capacious, and at distances from each other within the effective range of musket-shot. The others, on the contrary, were characterized by small bastions, scarcely capable of receiving artillery, and placed so far asunder as to defend each other very imperfectly. But after the termination of the civil wars which desolated the country, the attention of the French government was directed to the state of the military posts; and Errard, a member of the corps of engineers then instituted, was appointed to superintend the reparation of the old, and the construction of the new fortifications. The citadel of Amiens was built according to the plan proposed by this officer, who, in 1594, published a treatise on fortification, in which some effort is made to determine the principles which should regulate the forms and dimensions of the works.

In the method proposed by Errard the bastions are much larger than those of the earlier time, the length of their faces being, as at present, about one-third of the distance between the salient angles of two collateral bastions; an orillon occupied nearly two-thirds of the length of each flank, which was very short, and formed an angle of about 80° with the curtain. This direction appears to have been given to the flanks in order that the guns behind their parapets might be as much as possible concealed from the view of the enemy in his counter-battery; but it is evident that the defenders of the opposite flanks, laying their muskets perpendicularly to the lengths of the parapets, according to the general practice, would almost inevitably fire upon each other, or upon those who were stationed on the curtain.

De Ville, who composed a treatise on fortification in 1629, made several improvements on the method proposed by Errard, the principal of which were an augmentation of the length of the flanks and a perpendicular direction of the latter with respect to the curtain: by these changes a better defence was obtained from the flanks, and the evil above mentioned was diminished. But a still greater amelioration was made by Count Pagan, who, in 1645, proposed to make each flank [See the half-front of Fortification between F and G, *fig.* 1, Bastion] perpendicular to the produced face of the collateral bastion: the reciprocal defence which the works should afford each other is thus complete, and the men are not in danger of being fired on by each other. Pagan retains the orillons at the shoulders of the bastions, and he gives to the latter double or triple flanks; but the construction of these, on account of their numerous inconveniences, has ever since been discontinued.

During the reign of Louis XIV. a general reparation or reconstruction of its fortresses was ordered by the French government; and the talents of Vauban were exercised in devising and carrying into execution those improvements in the art of fortification which, together with the merit displayed in the conduct of fifty-three sieges, have given that engineer so much celebrity. Besides the changes made in the disposition of the parts of the enceinte, the outworks were entirely remodelled; and instead of assigning, for the delineation of the plan, numerous arbitrary rules which varied with the nature of the polygon, Vauban adopted the length of the side of the polygon as a base, and took certain aliquot parts of this line for the dimensions of the several divisions of the rampart; thus reducing the construction to a few simple precepts which were applicable to places of all magnitudes. These precepts being founded on the uses of the works may be justly considered as constituting a system of fortification; and from that time to the present scarcely any deviations have been made from them in the construction of great fortresses. A brief outline of the system will therefore be here given. [See the half-front of fortification between G and E, *fig.* 1, Bastion.]

The length of each side, as F E, of a regular polygon supposed to surround the town or position, is made equal to 360 yards, in order that all the parts of the rampart on each front of the enceinte might be within the range of the arms employed in the defence. Those arms are generally large muskets, whose point-blanc range is estimated at about 300 yards. Now these being supposed to be placed on the flanks, as at *e* or *f*, might be employed to oppose the formation of the counter-battery at H, or at the corresponding point on the left of F, therefore, if we assume the length of the line from *e* to H to be 300 yards, and deduct from it the estimated breadth of the main ditch and covered-way (40 yards), we have 260 yards for the length of *e* E or *f* F, which is called the line of defence. This is also the distance of E or F from the shoulder of the collateral bastion; and if we add to it the length of the face of the bastion, which is 103 yards, or two-sevenths of E F, in order that, in the inferior polygons, the bastion may have sufficient capacity, we obtain about 360 yards for the distance between the salient points F and E of the two bastions; and it may be observed, that a few yards more or less in the dimensions need not be regarded.

The directions of the faces of the bastions on each front coincide with lines drawn from the angles E and F of the polygon, through the extremity of a perpendicular let fall from the middle of the line E F and made equal to one-sixth of that line; and each flank is the chord of an arc, described either from the opposite angle E or F of the polygon, or from the nearest shoulder of the collateral bastion, as a centre. By this construction the flank is rather greater in length than the enemy's counter-battery, which is necessarily limited by the angle of the glacis and the prolonged face of the nearest bastion; and it is nearly perpendicular to the direction of that face: the reason why it is not made exactly so is, that a man on the flank, placing his musket perpendicularly to the line of parapet, will thus be able to fire into and defend a breach which may be made in the face of the collateral bastion. The curtain is determined by a line joining the interior extremities, near *e* and *f* of the flanks; and, with the height which Vauban assigned to the rampart of the enceinte, this length will permit the fire of musketry from each flank to defend the opposite half of the ditch between the flanks. The line which on the plan indicates the directions of the faces, flanks, &c., of the works, is called the magistral line; it forms the exterior side of the ramparts in *fig.* 1 [Bastion], and coincides with the cordon, or projection, at the top of the revetment N, *fig.* 2.

The dimensions of the ditch are determined by the necessity of obtaining from it the earth for the formation of the ramparts and parapets, care being taken that it be not so wide as to allow the enemy, from a battery situated as at K, *fig.* 1, on the crest of the glacis, to see, and consequently to batter, the escarp wall near the foot of the latter. [BREACH.] The counterscarp wall is rounded opposite the flanked angles at E or F, and from thence tends towards the shoulder of the collateral bastion.

The improvements made by Vauban in the ravelin are described under that word: Q represents one-half of that work; and it will be necessary here to say, merely, that its plan is determined by using the angular points near *e* and *f*, formed by the magistral lines of the flanks and curtain, as centres, and with radii equal to the distances from thence to points taken on the faces of the collateral bastions, at 10 yards from their shoulders, describing arcs; the intersection of these arcs determines the salient angle of the ravelin; the magistral lines of its faces tend from that intersection to the points just mentioned, and terminate on the counterscarp of the main ditch.

The traverses in the covered way were proposed by Vauban, in order to diminish the effect of the ricochet; and he was the first engineer who formed the spacious places of arms, as they are called, at L, in the re-entering parts of the covered-way, in order to obtain room for assembling troops, and to afford a good crossing fire of musketry from their faces for the defence of the glacis in front of the bastions and ravelins.

An attention to the reliefs of the several ramparts of a fortress is no less necessary than to the plans; for, as it would be advantageous, when the approaches of the besiegers are near the foot of the glacis, that a fire of artillery should be made from the ramparts of the enceinte or ravelin, and of musketry from the covered-way at the same time, the reliefs of those ramparts should be determined by imagining a line to be drawn from the foot of the glacis through a point three or four feet vertically above the crest of the latter, that is about 11 feet above the ground, and to be produced through the parapet of the said enceinte or ravelin; then, if the soles of the embrasures, which are necessarily 4½ feet below the crest of the parapet, be made to coincide with such imaginary line, the fire of artillery from them may be directed to the enemy's trenches without incommoding the defenders of the covered-way. The crest of the enceinte thus determined will be about 18 feet above the ground, and that of the ravelin about 3 feet less.

The tenaille, P, *fig.* 1, [BASTION.] will be described under that word; but it may be mentioned here that the relief of this work is determined by the consideration that, while it should be high enough to mask the postern in the curtain behind it, the men stationed on it to defend the ditch should be below the lines of fire from the flank of one bastion, when directed to the foot of a breach supposed to be made near the shoulder of that which is collateral to it, in order that they may not be injured by that fire.

As Vauban had occasionally to adapt works constructed according to the principles above mentioned, to the old fortifications which then existed, the particular method employed in disposing them acquired the denomination of his second system; and when, subsequently, he fortified Neu Brisach, some few modifications which he was led to make gave rise to a new distinction, the works of that place being considered as forming a third system. In both these systems the bastions V, *fig.* 3, [BASTION] are separated by a ditch from the enceinte; and this circumstance is so far advantageous, that the place would not be compelled to surrender immediately upon those works being taken by the besiegers. The enceinte consists of a long curtain, either quite straight or broken by two short flanks; and at the angles of the polygon are small bastion-towers of masonry (T, *fig.* 3), in whose flanks are formed casemates to contain artillery for the defence of its ditch. This great engineer died in 1707, at the age of 74 years; and, from his time, the French fortification has been that of all Europe.

It would be improper in this place to omit the name of Coehorn, who was a contemporary of Vauban, and who is also distinguished by the invention of three methods of fortifying places; of which however the first only, and that partially, has been put in execution. The outline of the plan differs but little from that of his rival's first system, but the shoulders of the bastions are strengthened by large towers, or orillons, containing casemates. In the interior of each bastion is another, on a higher level, and on the exterior is a counterguard, or detached work, consisting of two faces. A large ravelin, inclosing a smaller one on a higher level, is placed before the curtain, and the whole is surrounded by a broad covered-way, whose places of arms are retrenched by brick redoubts. The ditches are full of water; and the terrepleins, as well of the bastions and ravelins as of the covered-way, are sunk below the natural surface of the ground, so that it would be impossible, in the marshy soil on which the fortifications are supposed to be constructed, for an enemy to dig trenches there in order to form covered approaches. The terrepleins of the principal works are also well defended by fire from the covered galleries which cross them, or which are formed within the masses of the ramparts.

It should be observed that the salient points E, F, &c., of the bastions and ravelins in Vauban's system being nearly equally distant from the centre of the place, the trench executed by the besiegers to connect the glacis before the former works will also connect that which is before the latter; and that, in consequence of this construction, breaches may be formed, and assaults made, at one time, in the enceinte and outworks. With the view, therefore, of preserving the former untouched till some time after the ravelins may have been taken, the French engineer Cormontaingne proposed, about 30 years after the death of Vauban, to advance the salient points of the ravelins as much as possible, by increasing the length of the faces to the utmost limit which a regard to the due magnitude of the flanked angle will admit. Thus the magistral line of his ravelin is determined by the sides of a triangle whose base is a line joining two points on the faces of the collateral bastions, at 30 yards from the shoulders, and whose opposite angle is equal to about 70 degrees. By this construction it would become impossible for an enemy to crown the glacis of a bastion till he had got possession of the two collateral ravelins, on account of the fire which, from these, might be made upon his approaches between them; and the fall of the place would be delayed by the time spent in conducting the approaches from the ravelins to the intermediate bastion.

In order that this benefit might be obtained in the highest degree, Cormontaingne suggested the propriety of fortifying places on polygons of the superior kind, and even, when possible, of constructing two or more fronts of fortification on one straight line; this practice would have the additional advantage of rendering the flanked angles of the bastions very obtuse, by which, not only would the increased capacity of those works permit stronger retrenchments to be formed in them, but the faces being produced outwards, would tend to points on the faces of the ravelins, and thus would be completely secured from the enfilading fires of the besiegers.

Besides the above general modifications, Cormontaingne made several improvements in the details of the works. He made the flanks exactly perpendicular to the prolonged faces of the collateral bastions, for the sake of a more complete flanking defence. He made the terrepleins of the ravelins merely wide enough to contain the artillery of the defenders; in order to increase the capacity of the redoubt in the ravelin, and to deprive the enemy of the space necessary for a battery on the ravelin, by which he might breach that redoubt. He also gave large casemated flanks to the latter work, in order that a powerful fire might be directed from them against the enemy, if he should attempt to mount the breach in the face of either bastion before he had got possession of the redoubts as well as of the ravelins themselves. A further improvement was made by this engineer in adding to each of the re-entering places of arms a spacious redoubt, which would render the defence of that place more obstinate, and cover the passage between the tenaille and the flank of the bastion.

As early as 1640, Dillichs, in a work published at Frankfort, proposed a method of fortifying places, which consists in surrounding them by lines of rampart forming with each other a series of angles alternately salient and re-entering; and, subsequently to the time of Vauban, a few other projects of a like nature have been suggested. The most remarkable of these is that which was published in 1776 by the French General Montalembert, who entitles his method *Fortification Perpendiculaire.* Its outline on the plan is a series of the sides of equilateral triangles formed on those of a dodecagon inclosing the place; the re-entering angles

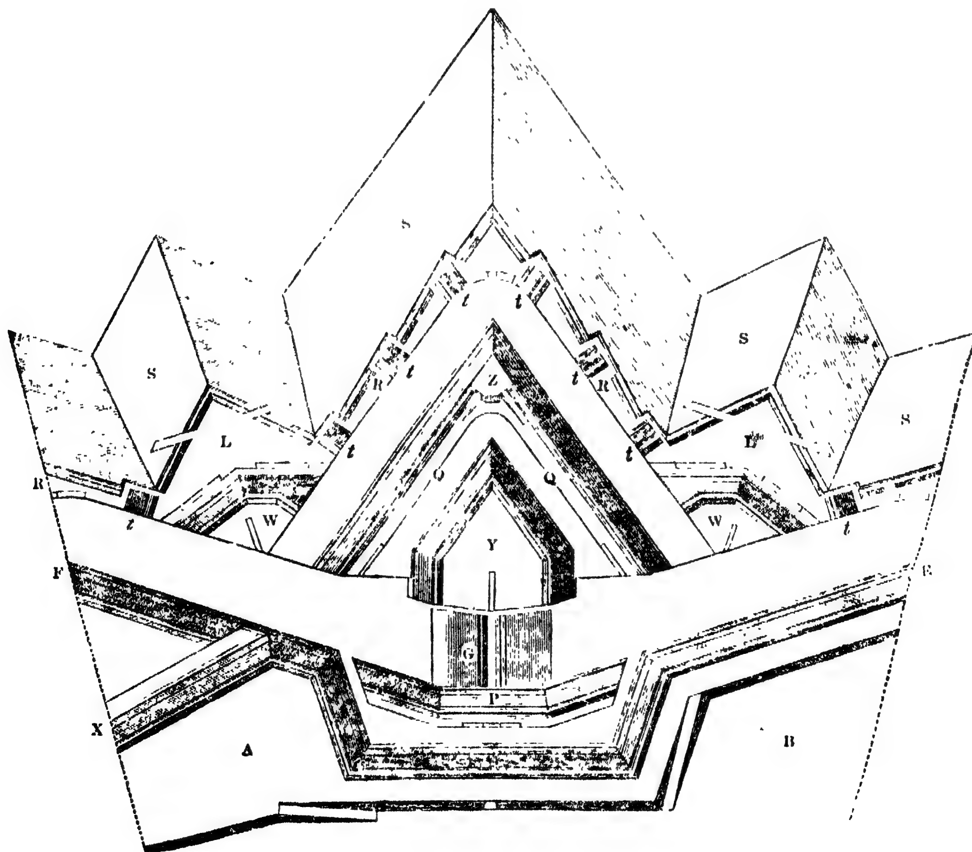
being consequently right angles: and, as the general has developed some useful ideas concerning the interior defence of a place, though no existing fortification affords an example of the method, a short description of it may with propriety be given.

Three parallel ramparts of earth, of the form above indicated, and separated from one another by wet ditches, surround the place: the berme at the foot of the first and third is protected by a simple wall, and that at the foot of the middle rampart is covered by a loop-holed gallery on its whole length. Beyond the outer ditch is the covered-way, whose re-entering angles are fortified by strong redoubts. In the re-entering angles of the two interior ramparts are formed casemated batteries, the fires from which would sweep the surfaces of the ditches in front, in the directions of their lengths; and, within the enceinte of the place, a circular redoubt, or tower, of brick-work, carrying several tiers of guns, is intended to defend the interior rampart, if, at length, it should be forced. The merit of this system is supposed to consist chiefly in the powerful fire which the casemates would afford, as from their situation, they would scarcely be injured by the enemy; in the difficulty which the latter would experience in getting over the detached walls, and in the great force which the defenders, by means of the spacious communications, might bring up to oppose the assailants.

During the existence of the French empire, the celebrated Carnot proposed to restore the balance between the attack and defence of fortresses, which the inventions of Vauban had made to preponderate greatly in favour of the former, by means of powerful sorties from the place and an abundant discharge of stones and balls from mortars fired at considerable angles of elevation; thus annoying the besiegers in their trenches, and either putting great numbers of their men hors de combat, or compelling them to recur to the slow process of blinding their approaches. Adopting, in his method of fortifying places, the proportions of Cormontaingne for the plan of his bastions, but making the whole length of his front of fortification equal to 480 yards, he detached the bastions from the enceinte, which he made to consist of a simple polygonal rampart of earth. In rear of the tenaille between the bastions he placed a fausse-braye, whose exterior side was to be protected by a casemated tower at each extremity; and, behind the gorge of each bastion, he formed a row of casemate vaults, in which the mortars were to be placed for throwing stones, &c. into that work when gained by the enemy. Adopting also the ideas of Montalembert respecting detached walls, he proposed to surround the enceinte by one, which was to be loop-holed in order that a fire of musketry might be made from it, and to construct a similar wall before the faces and flanks of the bastions. The bastions were to be covered by narrow counterguards; a cavalier, or lofty redoubt, in front of the tenaille, was to defend the collateral faces of both bastions and counterguards; large ravelins were to cover the central parts of the fronts of fortification and afford crossing fires on the ground before the bastions; while mortars placed on the faces of the work and on the barbettes at the angles were to discharge their missiles over the parapets. A ditch surrounds the whole, and its exterior side is made with a gentle slope from the bottom to the level of the natural ground in front, for the purpose of facilitating the sorties; the corresponding facility which the enemy might have for descending into the ditch being disregarded on account of the supposed impossibility of maintaining himself there under the hail of stones and shot from the works.

It was supposed that the detached wall, being covered as before mentioned, would present an impassable obstacle to the assailants; but an experiment made at Woolwich in 1824 has proved the possibility of breaching it by a fire of shot and shells, directed over the parapet of the counterguard, from artillery of great calibre, at the distance of 400 yards from the latter work. The efficiency of the vertical fire, as it is called, of stones and shot from the works has also been controverted; and experiments have been made which seem to prove that the momentum acquired by the missiles in their descent would not be sufficient to do serious injury to a man on whom they might fall, if he were protected by a proper head piece.

Plan of a Front of Fortification according to the Method of Cormontaingne.



80 yards to an inch.

A, Solid Bastion. B, Hollow ditto. X, Retrenchment. P, Tenaille. G, Caponniere. Q Q, Ravelin. Y, Redoubt in ditto. L L, Re-entering places of Arms. W W, Redoubts in ditto. R R, Covered-way. *t t*, Traverses. S S, Glacis. Z, Barbette battery.

Soon after the commencement of the revolution, Bousmard, a French officer, who had entered the service of the king of Prussia, proposed to curve the faces of bastions on the plan, in order to diminish or prevent the effect of the ricochet, and to build casemates in the flanks of the tenailles for the purpose of more effectually defending the main ditch. But his principal improvement consisted in extending the covered way and glacis along the whole of the enceinte, and in placing the ravelin with its proper covered way and glacis on the exterior; in consequence of which disposition it would become impossible for the besiegers to breach the bastion by firing along the ditch of the ravelin, while the latter would possess all the advantages attending the greatest possible saliency. The ideas of Bousmard respecting the disposition of the ravelin were adopted by General Chasseloup de Labat, in the works which he executed, by order of Napoleon, to strengthen the fortifications of Alessandria; and the same engineer constructed a strong polygonal redoubt of earth in each of the places of arms before the flanked angles of the bastions and ravelins, in order to increase the quantity of crossing and reverse fires in front of the works.

The last modification of the bastion system which it will be necessary to mention, is that proposed by Choumara, who, partly to diminish the pressure of the parapets on the escarp revetment, and render the formation of a practicable breach more difficult, and partly to procure a close fire of musketry into the covered-way, suggests that a terreplein, like the old chemin des rondes, but with a slender breastwork to protect the defenders, should be left on the exterior of the parapets. The same engineer recommends that the flanks of the bastions should be lengthened by continuing them within the line of the curtain, and that they should have a greater relief than the latter, in order that a fire of artillery might be directed over it against the works of the enemy: he proposes also that a glacis of earth should be raised in the main ditch, high enough to mask the foot of the escarp revetment, and prevent it from being battered by a fire of artillery on the crest of the covered-way.

It is scarcely probable that any existing fortresses will be demolished for the sake of the advantages which would result from a re-construction according to any of the methods which have been proposed since the time of Vauban; but, on any future occasion which may present itself for fortifying a town or military post of importance, it may be found convenient to adopt some improvements in the construction of the works. Thus, the general system of Vauban, with the modifications proposed by Cormontaingne, being retained as the basis, casemates, like those of Montalembert, might be formed in the re-entering angles of the enceinte or tenailles; and detached walls or galleries for musketry in some of the dry ditches: detached ravelins, as proposed by Bousmard, may be constructed beyond those of the ordinary kind, in order to prevent the enceinte from being breached at the first crowning of the glacis; and a direct defence of the covered-way may be obtained from galleries formed within, or on the exterior of, the parapets along the faces of the works.

In the open attack of a fortified place it is evident that the loss of life would be so much the greater as the defensive works are stronger and better combined; and, in consequence, the necessity of making the approaches under cover to the last moment of the siege would become more urgent.

For the works occasionally constructed beyond the glacis of a fortress, see FLECHE, HORN-WORK, LUNETTES, and TENAILLONS.

Of the works which fall under the denomination of field-fortifications, BRIDGE-HEADS have been already mentioned. REDANS, REDOUBTS, and STAR-FORTS are described under those words; and the combinations of works which serve for the protection of armies, under LINES OF ENTRENCHMENT. Small forts with bastions are frequently considered as field-fortifications: their plan is similar to that of the enceinte of a fortress; but they differ from the latter in their size, in having low relief, and in the sides of their ditches being unreveted, or only faced with sods.

FORTIGUERRA, NI'COLO, an Italian prelate, whose writings display little of the austerity or seriousness of a churchman, was born at Pistoja, November 7th, 1674. In his youth he studied jurisprudence, and afterwards distinguished himself by his attainments in Greek. Having published a funeral discourse in honour of Innocent XII., he was appointed secretary to the papal nuncio in Spain, and on his return to Rome, in consequence of his ill-health, had a situation as one of his chamberlains bestowed upon him by Clement XI. in 1712, and was likewise made a canon of the church of Santa Maria Maggiore. By another pope (Clement XII.) he expected to be raised to the dignity of cardinal; but although an encourager of both poetry and poets, that pontiff evaded from time to time the fulfilment of the promise which he appears to have made, until Fortiguerra was lying on his death-bed, when he rejected the honour then proffered him in terms the reverse of courtly. Monsignor Fortiguerra's lyric poetry, in which he showed himself an imitator of Petrarch, is now forgotten; his fame rests entirely upon his 'Ricciardetto,' an heroico-comic poem in thirty cantos. This production, which was first published with its author's name Grecianized into Carteromaco, was begun by him without any plan, merely by way of proving with what facility he could imitate Ariosto, Pulci, and Berni, both in regard to their style and their fertile invention of incidents; when, at the instance of those friends for whom the first canto was hit off as a specimen, he was induced to proceed till he completed the whole, at the rate, we are assured, of a canto per day. Little, therefore, is it to be wondered at that the plot should be so desultory and the incidents so extravagant. Yet, notwithstanding the grotesqueness of the characters and events, and likewise the occasional carelessness of the style, this long *improvisatore* poem abounds with so much comic humour, droll satire, and happy burlesque, that it has long taken its place as a classical work of its kind, and has gone through numerous editions. There are two French translations of it; and a German one by Gries, the translator of Ariosto and Tasso, was published 1831-3. In English we have no more than a poetical version of the first canto, with an introduction and notes, by the late Lord Glenbervie (1822). 'Ricciardetto' was not published till after the author's death, which happened in 1735, the date of the first edition being 1738. Fortiguerra was probably aware that, however it might contribute to his fame as a poet, it was not likely to advance him in the church, since many of the descriptions are more spirited than decorous; nor has he been at all sparing of his satire on the monks.

FORTIS, ABBATE, an Italian, born in 1740, died in 1803, wrote many works on various branches of natural philosophy; but his reputation was established by his travels in Dalmatia, 'Viaggio di Dalmazia:' they have been translated into many languages, but the English translation, published at London, in 1778, is not only the best, but even preferable to the original, on account of the Appendix, various plates, and several other additions, which appeared for the first time with this translation.

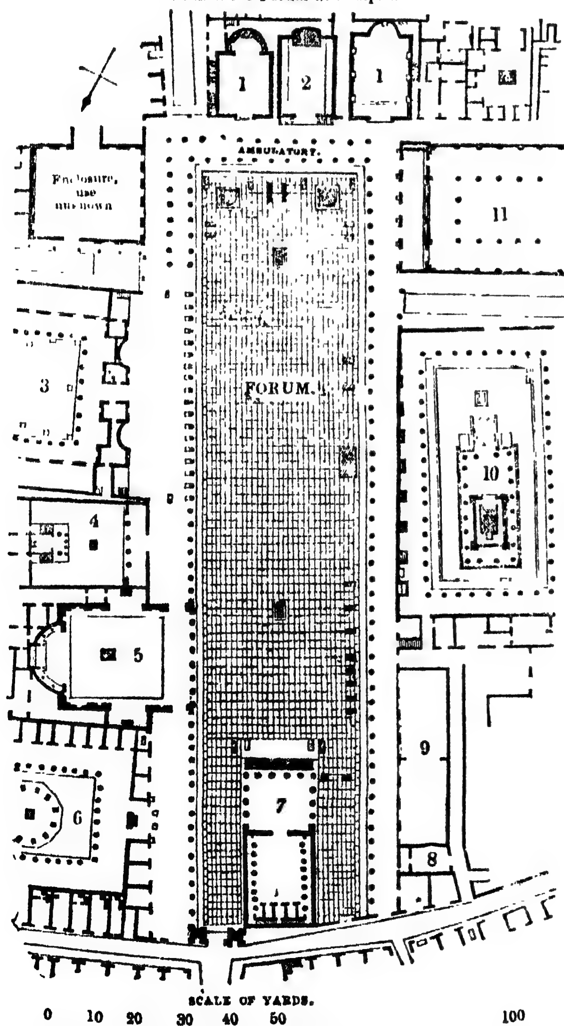
FORTUNATE ISLANDS. [CANARIES.]

FORTUNE, in the Roman mythology, was a goddess who was supposed to dispose, at her caprice, of the destinies of men. She was represented as blind, with winged feet, resting on a wheel. This deity did not figure in the more antient systems of theosophy; Homer does not mention her in the Iliad, but refers the events of this world to the decrees of Jupiter and of Fate. Fortune however was worshipped in Italy of old; by the Etruscans at Volsinii, under the name of Nursia; by the Latins at Præneste; and by the Volsci at Antium, where a splendid temple was dedicated to her, in which a sort of oracles were delivered. She had also temples at Rome. (Horace, *Od.* i. 35; Martial, v. ep. 1.)

FORUM, a large open space in antient Roman cities (corresponding to the Agora of the Greeks), usually surrounded with public buildings, where the citizens met to transact business, and where, previous to the erection of Basilicæ, causes were tried. From this last circumstance the word forum is used metaphorically for a place of justice. Nardini is of opinion, though without any show of authority, that the first forum, or Forum Romanum, at Rome, was placed on the Palatine hill. The Greeks made their Agora square, with a double colonnade, or ambulatory, above and below, but in Italy the width of the forum was made less than the length by a third, and the columns set wide apart, as the gladiatorial shows were formerly given in the forum. (Vitruvius, lib. v., 1.) The Roman fora were of two kinds, Fora Civilia and Venalia: the former were for law and political affairs, the latter for the purposes of trade. Rome contained nineteen fora of importance—the Forum Antonini, Archemorium, Argentarium, Au-

gusti, Boarium, Cæsaris, Cupidinis, Nervæ, Olitorium, Piscarium, Piscatorium, Pistorium, Romanum, Sallustii, Suarium, Tauri, Trajani, Transitorium, and Vespasiani. Of these the Forum Romanum, Nervæ, Trajani, Boarium, and Piscatorium, alone retain any traces of the splendid edifices with which they were once adorned. The Forum Romanum is situated in a narrow valley, not far from the Tiber, between the Palatine and Capitoline hills. It sweeps round towards the Fora of Cæsar and Augustus, which are between it and the larger Fora of Nerva and Trajan, all which, looking at their relative situations, were, no doubt, connected with it on the north. On the south it extended nearly to the Fora Boarium and Piscatorium, which were near the Pons Palatinus, now called Ponte Rotto. The exact limits of the Forum Romanum are very uncertain; Nardini (vol. ii., p. 138) endeavours to point out its boundaries. It was decorated with temples, statues, basilicæ, curiæ, rostra, triumphal columns and arches, which usurped the place of shops, schools, and even private houses, that originally stood in this forum. In the forum were the rostra, or pulpits, decorated with the beaks of ships, whence the orators harangued. According to Appian the rostra were placed in the middle of the forum, and he states that Sulla caused the head of young Marius to be hung up before the rostra in the middle of the forum. Varro, in his fourth book, 'De Lingua Latina,' places the rostra before the curia, which was near the Comitium, so that the orators would stand with their faces towards the capitol; but Plutarch, in speaking of the Gracchi, states the reverse to be the case.

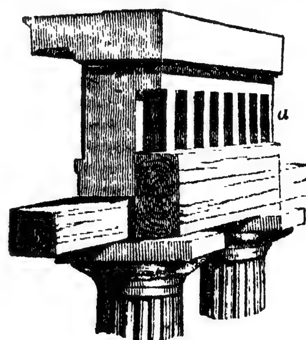
Plan of the Forum at Pompeii.



1, 1, Curia; 2, Ærarium; 3, Chalcidicum; 4, Temple of Mercury; 5, Senaculum; 6, Pantheon; 7, Temple of Jupiter; 8, Prison; 9, Granary; 10, Temple of Venus; 11, Basilica.

The Comitium was placed near the Curia; three columns of the former, commonly called the Temple of Jupiter Stator, still remain. Nardini places on the side of the Palatine hill, in succession, the Fabian arch, Græcostasis, Senaculum, Basilica Opimia, Ædicula of Concord, Temple of Romulus, Temple of the Dii Penates, Curia Ostilia, near which was the Comitium, Basilica Portia, Temples of Julius Cæsar, and Castor and Pollux. On the side towards the Tiber stood the Temples of Jupiter Stator, Temple and Atrium of Vesta, Basilica Julia, house of Lucius Tarquinius, and the Temple of Victory. On the side of the capitol was the arch of Tiberius, the temples of Saturn, of Concord, and of Vespasian, the school of Xanthus, the arch of Severus, which still remains, and the Tullian prisons. On the north side of the forum was the office of the secretary to the senate, and the Basilica of Paulus Emilius. There are however but few remains existing of a small number of these numerous buildings, and the greater part have entirely disappeared. A single monumental column stands near the Comitium, called the Column of Phocas. Besides these buildings there are remains of the temples of Fortune, Jupiter Tonans, Jupiter Capitolinus, and the Tabularium, though these are perhaps not within the boundaries of the forum. (See plates in Nardini's *Rome*, vol. ii. lib. v., c. 1.) A very beautiful restored view of the Forum Romanum was made by Mr. C. R. Cockerell, and a reduced view was engraved and published, with his permission, in the second volume of the 'Pompeii,' published by the Society for the Diffusion of Useful Knowledge, to which we refer our readers for an accurate notion of the splendour of the accumulated architecture of the Forum and the Capitol, and its vicinity.

The forum at Pompeii, which was constructed in the Greek style, cannot however be altogether considered, if we are guided by the authority of Vitruvius, a truly Greek Agora, which this author states was to be made square in form. It has however many Greek features. The Pompeian forum is of an oblong shape, surrounded on three sides with rows of columns, forming, with the advanced columns of the various buildings, a colonnade or ambulatory; above this there was a second, if we may judge from the remains of stairs at several places at the back of the colonnade. The fourth side of the forum is inclosed with two arches placed on each side of a large hypæthral temple, called the Temple of Jupiter On the west side are the prisons and the granary, with an enclosed court before it and the prisons; the Temple of Venus and the Basilica [Basilica]; and on the narrow side, opposite the Temple of Jupiter, are three buildings generally considered to be the Curiæ and Ærarium: on the east side is an enclosure, the use of which has not been determined, the Chalcidicum [Chalcidicum], the Temple of Mercury, the Senaculum, and a building supposed to be a large eating-house, generally known by the name of the Pantheon, in front of which are the Tabernæ Argentariæ. The enclosed area of the forum was paved with large square pieces of marble, and the sides of the area were adorned with statues. Opposite the curiæ and a short way from them is a small triumphal arch. The forum was closed at night with iron-barred gates, and it does not appear that chariots were admitted into it, as the pavement of the streets terminates at the back of the colonnade. The columns of the ambulatory are of the Greek Doric order, and were being restored in the same style, though with better materials, at the time the city was destroyed. The columns were aræostyle, and the architraves were most probably of wood, as we may infer from their



Construction in wood and stone of the aræostyle portico of the Forum. *a*, holes for the joists of the upper floor.

being destroyed, while the frieze and cornice of stone re-

main. The frontispiece to the first volume of the 'Pompeii' is a restored view of the forum, which gives an idea of the double colonnade, or upper and under ambulatory mentioned by Vitruvius as a characteristic of a Greek Agora.

FO'SCOLO, UGO, was born at Zante about the year 1777, of a Venetian family settled in the Ionian Islands. When yet a boy he lost his father, who was a physician and inspector of the hospitals at Spalatro in Dalmatia, and he returned with his mother to Venice, from whence he was sent to study at Padua. Having left that university without having made up his mind to any particular profession, he returned to Venice, and wrote a tragedy, 'Il Tieste,' which was performed in January, 1797. In that same year the antient aristocracy of Venice fell by the hands of Bonaparte, and Foscolo, who, like others of his countrymen, had expected the establishment of a new and popular republic, felt bitterly disappointed at the conqueror giving up Venice to Austria. At Milan and Florence he gave vent to his excited feelings in the 'Lettere di due Amanti,' afterwards published under the name of 'Lettere di Ortis.' This work, of little value as a novel, possesses a higher sort of interest from the political allusions, the bursts of invective, and the picture of society in those disjointed times, which it contains. The language is beautiful and the tone affecting, though perhaps too querulous and desponding; but as such it was in harmony with the then prevailing feeling. The 'Lettere di Ortis' had a prodigious success in Italy; but all the editions were mutilated except a private one printed at Venice in 1802, and that of 1814, which Foscolo himself published at Zürich with the date of London, which alone contains, among several passages left out in the other editions, the letter dated 17th of March, 1798, in which Foscolo clearly expressed his opinion of Bonaparte's character. Foscolo served as a volunteer in the Lombard Legion through the disastrous campaign of 1799, and followed the French in their retreat to Genoa, where he remained during the siege of that city till June, 1800, when the garrison capitulated, and was carried to France by the English ships. Meantime the battle of Marengo took place, Lombardy was reconquered, and Foscolo repaired to Milan: peace being concluded soon after, he returned to private life and to his literary pursuits.

In 1802, Bonaparte having called together at Lyon a meeting of Italian deputies in order to devise a new constitution for the Cisalpine republic, Foscolo was requested by some individuals then in office, to write an address to the First Consul, with an exposition of the state of the country, and the wishes of the people. He did write it, but in a very different strain from what they expected: he wrote it in the style of the Philippics, or the Verrine Orations of Cicero; he drew an eloquent but fearful retrospect of the oppressions, the depredations, the injuries of every kind which the people of Italy had suffered at the hands of the various military and civil authorities appointed by the French since 1796; the disgraceful persecution of the clergy and the so-called aristocrats, and other abuses of party triumph. This oration was, of course, never read to the First Consul, but it was published some time after at Milan—'Orazione à Buonaparte pel Congresso di Lione:' it forms an important memorial of the times, and an honourable testimonial of the uncompromising spirit of Foscolo, who seems to have taken Dante and Alfieri for his models. Foscolo remained for some years quietly at Milan under the mild administration of the vice-president Melzi. He published an Italian version of Callimachus 'De Coma Berenices,' with interesting notes and commentaries.

In 1805 we find him again serving in an Italian regiment which formed part of the army assembled near the coast of the British Channel for the intended invasion of England. Being stationed at St. Omer he there attempted an Italian translation of Sterne's 'Sentimental Journey,' in which he was most successful. When a few months after the camp of Boulogne was broken up, Foscolo went back to Milan, and did not return into active service. He lived for some time near Brescia, where he wrote his poem, 'Dei Sepolcri,' 1807, deprecating certain harsh regulations which forbade any monument or memorial being raised over the tombs of the dead. This beautiful little poem, full of lofty thoughts and lyric power, was dedicated by the author to a brother poet, Ippolito Pindemonte of Verona, and it secured to Foscolo a distinguished rank among the Italian poets. It was commented on, imitated, and even translated into Latin hexameters.

In 1808, Foscolo being appointed professor of Italian eloquence at Pavia, was privately urged by some official persons to begin his course by some tribute of praise to the emperor Napoleon, according to the received custom; and it was hinted to him that the decoration of the Legion of Honour would be the reward of his compliance. Foscolo remained unmoved: he took as the subject of his inaugural oration the origin and the object of literature—'Dell' Origine e dell' Ufficio della Letteratura;' and descanted on the moral and civil duties of literary men; on the nobleness of their calling when conscientiously exercised; and he exhorted the Italian youth to devote themselves to literature for its own sake; 'to study above all the history of their country, and the lives and works of Dante, Machiavelli, Galileo, and Tasso; to bend over their tombs and learn from those illustrious dead how they fed the sacred fire of genius through persecutions, torments, and exile, in the gloom of dungeons and amidst the squalidness of domestic poverty, and how they were supported in their trials by the love of their country, of truth, and of fame, which enabled them to leave to posterity the rich legacy of their works and the benefit of their example.' This address, delivered before a numerous audience, produced a thrilling sensation, and was followed by bursts of applause. Not a word had Foscolo said about emperor or prince, government or minister. A few months after the chair of Italian eloquence was suppressed in all the universities of the kingdom of Italy, and Foscolo retired to Borgo di Vico, near Como, where he enjoyed the society of Count Giovio and his family. He there wrote his tragedy of 'Ajax,' which was performed at Milan, and not only proved a failure, but involved him in a sort of ministerial persecution, because he was suspected to have alluded in his play to Napoleon's ambition. At the same time certain academicians whose pedantry he had ridiculed in another work, expressed their opinion in the Poligrafo, a literary journal, 'that whoever sneers at the labours of professors, academicians, and librarians, taxes thereby with ignorance the monarch who protects them, and becomes, by so doing, guilty of treason.' Foscolo however had some influential friends, and he was merely banished from Milan. At Florence, where he fixed his residence, he completed his translation of 'Sterne:' 'Viaggio Sentimentale di Yorick lungo la Francia, traduzione di Didimo Chierico;' and wrote another tragedy entitled 'Ricciarda,' a Hymn to the Graces, and other compositions.

In 1813 he was allowed to return to Milan, and in the following year, when the French abandoned the country and a provisional government was formed, Foscolo was appointed major on the staff, and endeavoured, though ineffectually, to save the ex-minister Prina from the fury of the mob. When the Austrians took possession of Milan, Foscolo drew up a protest in the name of the inhabitants of Lombardy addressed to the Allied Powers. He remained however still at Milan, and had the offer from some of the Austrian authorities of the editorship of a new literary journal; but having learnt that he was charged by the more rigid patriots of being a turncoat, he, all on a sudden, disappeared from Milan towards the end of 1814, and repaired to Switzerland, where he resided for almost two years, chiefly at Hottingen, near Zürich, where he published a correct edition of his 'Lettere di Ortis,' and also a satire in Latin prose, entitled 'Didymi Clerici Prophetæ Minimi Hypercalypseos,' in which he lashed his Milan enemies of the literary and courtly coteries who had annoyed him about his 'Ajax.' Not finding sufficient encouragement in Switzerland for his literary labours as a means of subsistence, he came to England about the end of 1816, and was introduced to some of the best society of the metropolis: he formed literary connexions, and wrote articles both for the Edinburgh and the Quarterly Reviews. In London he published his 'Ricciarda,' the Essays on Petrarch and Dante, which are among his best compositions, the 'Discorso Storico sul testo del Decamerone,' and the 'Discorso Storico sul testo di Dante,' which is a work full of erudition. He had engaged to superintend a new edition of Dante, with ample commentaries, but he did not live to finish this work. Want of order and of judgment in money matters involved him in embarrassments, which, joined to his fretful temper and assiduous application, shortened his days. He died of the dropsy on the 10th of October, 1827, at Turnham Green, near London, being about fifty years of age, and was buried in Chiswick churchyard, with a plain marble

slab and inscription over his tomb. Notwithstanding his eccentricities he secured wherever he lived some warm and lasting friends, who felt his death as a loss. The life of Foscolo derives a peculiar importance from the times he lived in, and the political scenes in which he mixed. He had the merit of standing aloof, one of the few, amidst the general prostration of mankind before the shrine of Napoleon. 'His unconquerable silence,' observes a by no means partial biographer, 'amidst the strains of vulgar adulation, deserves to be recorded in history. If amidst the Asiatic idolatry towards Napoleon, any kind of opposition can be said to have existed in Italy, Foscolo must be considered as the leader of it. Among a crowd of literati who prostituted their character, he alone succeeded Alfieri in gathering around him those youths who felt the love of study and independence, and without uselessly challenging an irresistible power, he tempered with his principles and his example their souls for present dignity and future resistance.' (Pecchio, *Vita di Ugo Foscolo*.) When the reaction came he refused likewise to associate with those who would not restore his country to national independence. But his sentiments, as expressed in his works, are never those of a partizan; he deals out with an impartial hand to all; his thoughts are generous and pure, his learning is real and unaffected, and he has added a fresh vigour to Italian prose. His dramas are the weakest of his productions. To his compositions already mentioned, may be added an Italian version of some cantos of the Iliad, 'Alcuni scritti e trattati inediti,' Lugano, 1829, including some of his lectures at Pavia, and various poetical effusions. ('*Opere Scelte di Ugo Foscolo*,' 2 vols. 8vo; Fiesole, 1833, *and an article on Foscolo and his Times, in* No. XVIII. *of the Foreign Quarterly Review*, May, 1832.)

FOSS, or FOSS-WAY, an antient Roman road in Britain, one of the best ascertained of any. It extended from the coast of Lincolnshire, on the north-east, to the coast of Devonshire on the south-west. It is supposed to have derived its name from the circumstance of its having had a ditch (fossa) on each side (Camden; Pointer's *Britannia Romana*), and appears, from a Roman milliare or mile-stone found by its side near Leicester, and now set up in a public place in that town, to have been formed or at least improved by the Romans in the reign of Hadrian, and probably at or about the time of that emperor's visit to Britain. It has retained its name among all classes of people better than any of the Roman roads.

This road first shows itself between Lincoln and the sea. It commenced probably from a Roman station somewhere on the coast between Saltfleet and Grimsby, and ran to Lindum (Lincoln), a Roman station of considerable importance, where it crossed another Roman or British road, the Ermine-street. Near its intersection with Ermine-street some pavement remained in Stukeley's time of flag-stones set edgewise. From Lindum the Foss runs south-south-west to Aquæ Solis (Bath), passing through the heart of the country. The sixth Iter of Antoninus partly coincides with this road, on which appear to have been the stations Crocolana (Brough or Bruff's, on the border of Lincolnshire and Notts, not far from Newark-on-Trent, and on the present road from Lincoln to that town), Ad Pontem (Farndon or Thorpe on the Trent above Newark), Margidunum (at or near East Bridgeford, Notts, on the road from Newark to Leicester), Vernometum (near Willoughby, Notts, near the border of Leicestershire), Ratæ (Leicester), and Venonæ (High Cross, near Claybrook, on the border of Leicestershire and Warwickshire, at the intersection of the Watling-street and the Foss-way); the remainder of the road to Aquæ Solis (Bath) does not coincide with any Iter of Antoninus. In one part, between Newark and Leicester, the antient pavement is visible, composed 'of great blue flag-stones, laid edgewise very carefully, taken from quarries by the side of the hill: the breadth of it one hundred feet or more.' In other parts the way has been entirely paved with red flints, seemingly brought from the sea-coast. Near Venonæ (High Cross) part of the road lies open, like a ditch, either never having been filled with stones or gravel, or else owing to these having been removed for the repair of more modern roads, or some other purpose. Between Venonæ and Aquæ Solis the road passes through Durocornovium (Cirencester), where it crossed the road from Londinium (London) to Glevum (Gloucester). From Aquæ Solis th' Foss-way continued its course in a pretty direct line to Ischalis (Ilchester), of which town it forms the principal street: from Ischalis, Stukeley supposed that it ran to Moridunum, now Seaton, in Devonshire: but others have conjectured that the Roman road between the river Ax and Honiton, of which there are plain vestiges to be discerned, is a continuation of the Foss; and that it ran through Isca Dumnoniorum (Exeter) across the Teign to Totness, which, according to some early accounts of this road, stood at one extremity of it. Beyond Ilchester some of the original pavement may yet be traced, composed of flat stones laid edgewise, and so close as to look like a wall fallen down. There are tumuli along some parts of the foss. The branches of this road, if any, are not ascertained. (Reynolds's *Iter Britanniarum*.)

FOSSA'NO, a town and bishop's see of Piedmont, in the province of Coni, is situated in a fine plain on the northern base of the maritime Alps, near the river Stura, and on the road from Mondovi to Savigliano. A canal, called Naviglio Nuovo, which leaves the Stura at Coni, and joins the Po at Carmagnola, passes by Fossano. The town carried on a considerable trade in corn, silk, hemp, and cattle, and has manufactories of leather, and also for spinning silk. It is a walled town, with 12,500 inhabitants, has an old castle, four churches, several convents, a royal college, with professors of rhetoric, philosophy, and theology, and a college for boarders, kept by the fathers Somaschi. Fossano lies 15 miles north-east of Coni, 15 east of Saluzzo, 12 north-west of Mondovi, and 35 south of Turin. [CONI.]

FOSSIL COPAL was first found in the blue clay at Highgate, near London; it occurs also at Wochlow in Moravia.

It occurs in irregular pieces or small nodular masses. Its colour is yellowish or dull brown; nearly opaque: lustre resinous; fracture conchoidal; specific gravity 1·046. When heated it yields an aromatic odour, and melts into a limpid fluid; it burns with a yellow flame and much smoke: when strongly heated in contact with the air, it is totally dissipated. It does not appear to have been analyzed.

FOSSILS. The term 'Fossil,' in its general acceptation, signifies that which may be dug out of the earth. In this sense, antiquities, as well as natural metallic and mineral bodies, may be said to be fossils. But the word is generally used among geologists and mineralogists to designate, sometimes, simple and compound mineral bodies, such as earths, salts, bitumens, and metals, but, more generally, the petrified forms of plants and animals which occur in the strata that compose the surface of our globe. Most of these fossil species, many of the genera, and some of the families, are extinct; and all of them were considered in the darker ages to owe their origin to the plastic power of the earth. They were named *Lapides idiomorphi*, *Lapides figurati*, and, as their organic nature began to be suspected, *Lapides diluviani*. Superstition was, in old times, busy with some of them, the Belemnites and Ammonites, for example.

The appellation *Petrifacta*, petrifactions, soon became common in books and catalogues of cabinets, and then Sir John Hill's proposition to denominate such petrified bodies *extraneous*, or *adventitious fossils*, was adopted by many naturalists. Parkinson objected to 'Petrifactions' as a general term, and distinguished 'Fossils' by employing the expression 'Primary Fossils' to denote those mineral substances which are supposed to have been native, or, in other words, to have existed primitively in the earth; and by applying the appellation 'Secondary Fossils' to the petrified exuviæ of plants and animals. Though the terms of this last-mentioned writer are now no longer adopted, he must always be considered as one of the fathers of this branch of geology, a branch which William Smith first effectively used as the key to the stratification. In the steps of Smith the first writers on this subject have since trod: and the study of 'Organic Remains,' by which name the animal and vegetable bodies penetrated by or converted into mineral substances are now known as a whole, has become of first-rate importance in deciphering the history of the lithological structure of the earth's crust. The well-known Eocene, Miocene, and Pliocene periods of Lyell, for instance, depend in a great degree upon the proportionate absence or presence of living species among the organic remains which have hitherto been discovered in certain groups of strata of comparatively modern origin.

Some notices of the fossil plants and animals, when such are known, are given in the articles which relate to existing families, genera, or species; and extinct families,

genera, and species, are treated of under their respective heads.

FOSSUM, in the bailiwick of Christiania in Norway, a mining town and district, about 40 miles west of Christiania, near the Houg-Foss, the largest fall in Norway, over which the Semoen is precipitated nearly 50 feet in perpendicular height. Here are iron works and a cannon foundry, and at Modum, near it, is a large manufactory of smalts, zaffres, &c., which are made from the superior kind of cobalt, found in the neighbouring mine at Stutterud.

FOTHERGILL, JOHN, was born of a Quaker family, on the 8th of March, 1712, at Carr-End, near Richmond, in Yorkshire. After obtaining the elements of education in the school of Sedbergh, in the same county, he learned pharmacy from an eminent apothecary named Bartlett, and then proceeded to Edinburgh. Here he took his degree of M.D. in 1737, the thesis which he published on this occasion being on the use of emetics. ('De Emeticorum Usu in variis Morbis tractandis.') In order to become a physician in practice as well as theory, he now diligently attended St. Thomas's Hospital, in London. In 1740 he travelled into Holland, France, and Germany, and then settled in London. In 1748, an ulcerated or gangrenous sore throat, which had prevailed epidemically, gave Fothergill an opportunity of displaying his great practical talents. This kind of sore throat is now believed to be related to scarlet fever, and indeed to be the essential and dangerous part of that disease, of which the eruption is merely the outward and harmless indication. In Fothergill's time, however, this malady was confounded with the ordinary or inflammatory sore throat, and being treated accordingly, with bleeding and purgatives, was very fatal. Fothergill, on the contrary, used emetics, mineral acids, bitters, and a little wine, and lost but few cases.

The two most prominent points in the life of Dr. Fothergill are the remarkable success with which he practised his profession and the unwearied benevolence with which he distributed the fruits of his labours. It is supposed that he gave away at least 200,000*l.*

Dr. Fothergill published several papers in the 'Philosophical Transactions' on the origin of ambergris, the rupture of the diaphragm, &c.; and he is also the author of essays on the plant producing Aleppo scammony; on the use of bark combined with small doses of calomel in scrofula, and calomel alone in sciatica, lumbago, and worms; on the use of hemlock in cancer; on the botanical, chemical, and medical history of the cortex Winteranus and catechu; on the treatment of hooping-cough by very small doses of tartar emetic combined with an absorbent earth; on dropsy, and the disadvantages of putting off tapping too long; on chronic ulcers of the legs; on phthisis, and the abuse of balsams and bark in this disease; on febrile rheumatism of the face; on angina pectoris; on the ulcerous sore throat; on hydrocephalus internus, an essay thought by Vicq-d'Azyr to be one of the most perfect descriptions to be found in medicine; and advice to women between forty and forty-five years of age, or rules to be observed on the cessation of the catamenia.

Fothergill improved the art of recovering the drowned; showed the necessity of prohibiting burials in towns, and the means of diminishing the frequency of fires. The editions of his works are those of London, 1781, 8vo.; 1783, 3 vols. 8vo.; 1784, 4to. Fothergill died on the 26th of December, 1780, in the sixty-ninth year of his age. (*Biographie Universelle; Lives of British Physicians.*)

FOTHERINGAY. [NORTHAMPTONSHIRE.]

FOUCHE', JOSEPH, duke of Otranto, was born in 1763, at Nantes, and educated in the college of the Pères de l'Oratoire. Being unable, on account of his delicate constitution, to follow the profession of his father, who was captain of a vessel, he applied himself to study, and after having completed his course at Paris, he lectured in different towns of France on various philosophical subjects, till on his marriage he finally settled in his native town and began to practise as an advocate. In 1792 he was returned by the department of the Loire Inférieure as a member of the national convention, in which capacity he voted for the death of the king, and against the appeal to the nation. In 1793 he was sent with Collot d'Herbois on that mission which deluged Lyon with blood, but still he had the courage to oppose some measures of his infamous colleague. On his return to Paris, he was elected (1794) president of the Jacobin club, but he was soon expelled from it by the enmity of Robespierre. After the fall of Robespierre, Fouché being considered as a dangerous terrorist, was arrested, but afterwards liberated under the proclamation for a general amnesty, on the 26th October, 1795. He remained in private life till 1798, when he was employed in Italy, and after his return to Paris the Directory nominated him minister of the police of the republic. It was in this capacity that he displayed his great talents, which were united with an extraordinary degree of courage, firmness, and activity. He had the boldness to adopt vigorous measures for the suppression of popular assemblies. Having supported Bonaparte after his return from Egypt, he was confirmed in his office upon the establishment of the consulate. He had the address to render himself necessary to all parties by tormenting Bonaparte on the one hand with rumours of conspiracies, and on the other by screening from his vengeance many royalists. Bonaparte however dismissed Fouché in 1802 from his office, but on his accession to the throne, he restored him to his former post. Fouché's vigilance maintained the tranquillity of the empire while Napoleon was occupied in foreign wars; and having the duties of minister of the interior added to those of his office, he greatly contributed by his arrangements to prevent the success of the English expedition against Holland in 1809. In the last-mentioned year he was created duke of Otranto, but he fell out of favour for having used in his proclamation to the national guards the following expression—'Let us prove that Napoleon's presence is not necessary in order to repel our enemies.' In 1810 he was nominated governor of Rome, on condition of delivering his correspondence to Napoleon, which having refused to do, he was sent to Aix. He was again recalled; but as his views did not coincide with those of the emperor, Fouché retired into the country. In 1813 Fouché was made governor of the Illyrian provinces, but the progress of the allied troops compelled him to relinquish his post and to retire to Italy. After the abdication of Napoleon, Fouché again retired to his estates in the country, and refused to take any part in political intrigues. On Napoleon's return from Elba, he was suspected by the Bourbons, and an order was given for his arrest, but he contrived to make his escape. Napoleon again nominated Fouché minister of police, but he accepted the office only on the understanding that Austria and England secretly connived at Napoleon's return from Elba. As soon as he learned that the congress of Vienna had declared against Napoleon, he tried to persuade the emperor, in case his negotiations should prove unsuccessful, to abdicate and retire to the United States of America. He strongly advocated the principles of liberty during the hundred days of Napoleon's second reign, and strongly urged the emperor to abdicate after the battle of Waterloo. Fouché being put at the head of the provisional government by the chambers, promoted the departure of Napoleon, negotiated with the allied powers, and by his intrigues baffled the scheme of Carnot and other patriots to defend Paris. At the beginning of the negotiation he was not inclined to promote the second restoration of Louis XVIII., but notwithstanding this he was called by the king, immediately after the capitulation of Paris, and nominated minister of police. This circumstance gave rise to a general belief that he had deceived Napoleon all the time after his return from Elba, and that he constantly maintained a secret correspondence with the allied powers and the Bourbons. In his capacity of minister of police he presented to the king two reports on the state of France, which by their boldness excited the hatred of all parties. His advice to grant a general amnesty was not followed; and he signed with his own hand as minister of police the ordonnance of Louis XVIII. of the [illegible]th July, 1815, by which many persons were excepted from the amnesty. Being driven by the hatred of the royalists to resign his office of minister of police, the king nominated him his ambassador to Dresden. The law of the 12th January, 1816, by which all those who had voted for the death of Louis XVI. were banished from France and deprived of the estates which had been granted to them, was extended to Fouché also, who from that time lived in different parts of Austria. He died at Trieste in 1820. 'The Memoirs of Joseph Ant. Fouché, duc d'Otranto,' which appeared at Paris, 1824, were declared by his sons to be a spurious production; but there are many reasons for believing them to be authentic, and it is a known fact that he dictated his memoirs to his secretary Desmarteau.

A curious work was published at Paris in 1833, which throws great light on Fouché's character, and on the system of the imperial administration in France, 'Témoignages historiques, ou quinze Ans de haute Police sous Napoléon, par Desmarets.'

FOUGASS, a small military mine, formed by sinking in the ground, to a depth not exceeding 10 feet, a box of powder, or one containing two or more loaded shells. The train of powder by which it is to be fired is contained in a linen tube, and this is frequently protected by being placed in a case of wood. A trench is cut in the ground to receive the train, but it is subsequently filled up.

Fougasses are sometimes employed in the defence of field forts, and then they are formed under the glacis of the latter at the points where the assault is expected: in this case generally the train of powder is conveyed under ground to the counterscarp of the ditch, where the fire is to be applied; but occasionally this is done in the interior of the work, the train being then made to pass under the bottom of the ditch.

Sometimes a fougass is used to destroy a small work, in which case it is sunk within the mass of the rampart or parapet.

FOUGE'RES, a town in France, capital of an arrondissement, in the department of Ille et Vilaine. It is on the left bank of the river Couesnon, 160 miles in a direct line west-by-south of Paris.

Raoul of Fougères built a castle here in the twelfth century in place of one destroyed by Henry II. of England. Fougères was taken by the English under John in the year 1202, and again in the reign of Henry VI., in 1448.

The town is agreeably situated upon a height; it owes to its elevated situation a pure atmosphere and an agreeable prospect. It is not very well laid out, and there is no *place* or open space of any extent; but some of the streets are wide, and the houses are very well built. The ruins of the castle built by Raoul still remain in one of the fauxbourgs; its Gothic towers and ramparts form a picturesque object from some points of view.

The population of Fougères in 1832 was 7446 for the town, or 7677 for the whole commune. The principal manufactures of the town are common linens, sail-cloth, flannel, hats, and leather; there are many dye-houses, and the scarlet dye is particularly famous for its brilliancy, which it is supposed to owe to the quality of the water of the Nançon, a little stream that falls into the Couesnon a short distance below the town. Trade is carried on in corn, cattle, linens, woollens, butter, honey, and wax. The market is considerable, and there are nine fairs in the year. In the neighbourhood of the town, which is fertile in wheat, oats, buckwheat, chestnuts, fruit, cider, and perry, are a glass-house and several paper-mills. The town is at the convergence of several roads. There are in it a subordinate court of justice and some other public offices, a high school, and public baths. In the forest of Fougères, about half a mile north of the town, are three remains of antiquity—two cromlechs, one of them with its upper stone about 16 feet long, 8½ wide, and nearly 4 thick; the other nearly destroyed; and a suite of subterranean apartments, built with freestone and vaulted, called *Les Celliers de Landéan*, and said to have been formed by Raoul of Fougères (mentioned above) in order to conceal his own treasures and those of the people of Fougères from the avidity of Henry II. of England. His precautions were, however, in vain, that king having taken his effects before they could be placed in security.

The arrondissement of Fougères comprehends 6 cantons and 57 communes; it had, in 1832, 81,788 inhabitants. Paper and glass are manufactured by them.

FOULAHS or **FOULHAS**, a nation widely spread along the western coasts of Africa, occupying the countries north of Cape Palmas as far as the banks of the river Senegal. Some of the tribes are found 400 or 500 miles from the coast. They do not however occupy this tract alone, but together with three other nations, the Mandingoes, Serrawollies, and Jaloffs or Yalloffs. The principal kingdoms of the Foulahs are Fouta-Toro, Bondou, Casson, Ludamer, Kaarta, and Fooladu, on both sides of the Senegal; and south of the sources of the Gambia, the great kingdom of Foota-Jallore. The countries east of the last-mentioned nation are little known, but it would appear that the Foulahs extend to the very boundary of the kingdom of the Ashantees.

Major Gray describes the Foulahs of Bondou as being of the middle size, well made, and very active. Their 'skin is of a light copper colour, and their faces of a form approaching nearer to those of Europe than any of the other tribes of Western Africa, the Moors excepted. Their hair too is not so short or woolly as that of the black, and their eyes are, with the advantage of being larger and rounder, of a better colour and more expressive.' Mungo Park observes, that at Bondou and in other parts in the vicinity of the Moorish territories, their complexion is more yellow than in the countries farther south. In speaking of the negro nations, they rank themselves always among the white people. Their principal occupation is the rearing of cattle, and agriculture. Even on the banks of the Gambia, in the territories of the Jaloffs, and other tribes, the greater part of the corn is raised by them, and their herds and flocks are numerous, and in good condition. In the northern countries they have mostly embraced the Mohammedan faith, and send their children to schools, in which they learn to read and write. In the southern countries they are still heathens. They speak a peculiar language, different from those of the other nations among which they are settled. (Mungo Park; Goldbery; Gray.)

FOULIS, ROBERT and **ANDREW**, two learned printers of Scotland, were, it is supposed, natives of Glasgow, and passed their early days in obscurity. Robert is asserted to have been a barber. Ingenuity and perseverance however enabled them to establish a press, from which have issued some of the finest specimens of correct and elegant printing which the eighteenth century has produced. Even Bodoni of Parma, and Barbou of Paris, have not gone beyond some of the productions of the Foulis press. Robert Foulis began printing about 1740, and one of his first essays was a good edition of 'Demetrius Phalereus,' in 4to., published in 1743. In 1744 he brought out his celebrated immaculate edition of 'Horace,' 12mo., and soon afterwards was in partnership with his brother Andrew. Of this edition of 'Horace,' the sheets as they were printed were hung up in the college at Glasgow, and a reward was offered to those who should discover an inaccuracy. It has been several times reprinted at Glasgow, but not probably with the same fidelity. The two brothers continued to produce for thirty years a series of correct and well printed books, particularly classics, which, whether in Greek or Latin, are as remarkable for their beauty and exactness as any in the Aldine series. Among them may be enumerated 'Homer,' Greek, 4 vols. fol., 1756-58; 'Thucydides,' Greek and Latin, 8 vols. 12mo., 1759; 'Herodotus,' Greek and Latin, 9 vols. 12mo., 1761; 'Xenophon,' Greek and Latin, 12 vols. 12mo., 1762-67; with small editions of Cicero, Virgil, Tibullus and Propertius, Cornelius Nepos, Tacitus, Juvenal and Persius, and Lucretius. To these may be added a beautiful edition of the Greek Testament, in small 4to.; Gray's Poems, Pope's Works, &c. &c.

It is a melancholy reflection that the taste of these worthy men for the fine arts at last brought about their ruin; for having engaged in the establishment of an academy for the instruction of youth in painting and sculpture in Scotland, the enormous expense of sending pupils to Italy to study and copy the antients, gradually brought on their decline in the printing business, and they found the city of Glasgow no fit soil to transplant the imitative arts to, although their success in printing the Greek and Latin Classics had already produced them ample fortunes. Andrew Foulis died September 15th, 1775, and Robert in 1776 exhibited and sold at Christie's, in Pall Mall, the remainder of his paintings. The catalogue formed three volumes. But the result of the sale was, that after all the expenses were defrayed, the balance in his favour amounted only to the sum of fifteen shillings. He died the same year on his return to Scotland. A person of the name of Foulis, a descendant of one of the brothers, continued to print at Glasgow as late as 1806. His 'Virgil' of 1778, and his 'Æschylus,' printed in 1795, are considered beautiful productions. (Lemoine's *Hist. of Printing;* Nichols's *Lit. Anecd.*, vol. iii., pp. 691, viii., 475; Chalmers' *Biog. Dict.*)

FOUNDATION, the lower part or courses of the basement walls or piers of a building. In foundations it is of the utmost importance to prevent the settlement of the walls in an unequal manner: this can only be done by making the earth on which the foundation is set equally solid throughout its whole extent.

If the earth, when excavated to a sufficient depth to form

a good hold for the wall which is to be built in it, should not be solid or should be likely to swell or shrink with the change of temperature, as clay is apt to do; and if the superincumbent weight to be placed on the foundation is considerable, it is advisable to pile by driving pieces of timber into the excavation. The thickness of piles should be about a twelfth of their length, and their width apart depends on the weight to be placed upon them. Sometimes a level row of crossbearers or sleepers is laid on the piles, and the spaces between them are filled with stone or brick rammed up to the level of their upper faces, and then the whole is planked over. On the planking are laid the footings which are wider than the wall and project one beyond another, the lowest being the widest (thus).



Footings of the Foundation.

This is done to prevent the wall from sinking with its own weight into the earth, or rocking with the wind. In foundations from two to four courses of footings are usually employed. Inverts or inverted arches are often used between the foundations of piers, to distribute the weight more equally along the whole line excavated for the foundation. Where the ground is not very soft, and where the wall is to be supported on narrow piers, a piece of timber is sometimes split in half and laid at the bottom or on the lower courses of the brickwork or masonry.

The breadth of a substructure should be proportioned to the weight of the superstructure. Nicholson, in his architectural dictionary, says, 'if the texture of the ground is supposed to be constant, and the materials of the same specific gravity, the breadth of the foundation will be as the area of the vertical section passing through the line on which the breadth is measured; thus, for example, suppose a wall 40 feet high 2 feet thick to have a sufficient foundation of 3 feet in breadth, what should be the breadth of a wall 60 feet high $2\frac{1}{4}$ feet thick? By proportion it will be $40 \times 2 : 3 :: 60 \times 2\frac{1}{4}$: the answer = $5\frac{1}{16}$ feet.

'This calculation will give the breadth of the foundation of the required wall, equal to the breadth of the insisting wall itself, when the height of the required wall is equal to the ratio, which is the first term ($40 \times 2 = 80$) divided by the second term (3) $= \frac{80}{3} = 26\frac{2}{3}$ feet. Thus a wall of $26\frac{2}{3}$ would have the breadth of its foundation equal to its thickness above the foundation, and less than $26\frac{2}{3}$ feet would have a thinner foundation than even the superstructure. But though the calculation in this case gives the foundation less in breadth than the thickness of its superstructure, it must be considered that it only calculates the true breadth of the surface that should be opposed to the ground, in order to prevent the wall from penetrating by its weight: though the rule gives all the width that is necessary, on account of the weight of the insisting wall, yet the breadth of the footing should always be greater than that of the superstructure, as it will stand more firmly on its base when affected by lateral pressure, and be less liable to rock by the blowing of heavy winds.' (Nicholson's *Dictionary, Foundation.*)

Concrete composed of gravel or shingle and hot lime is often used to form a solid bearing for the footings of foundations. The greatest care and judgment are required in making foundations for heavy superstructures, for if the piles should be of a bad quality and the ground in which they are driven of a very loose and boggy nature, the same catastrophe which occurred at the new custom-house in London may be expected to take place. In this building it was found necessary to remove the piles and loose earth and form a solid concrete foundation.

In brick foundations the footings have sets off, or projections of about an inch and sometimes more. In stone walls the footings are at least six inches in projection on each side of the wall which is to be carried on the foundation.

FOUNDING, one of the mechanical arts which embraces all the operations of reducing ores, and of smelting and casting metals. There are various branches of the art, and some difference prevails in the minor details of the processes, as in iron, brass, and bronze founding; casting guns and cannon, types for printing, and bell founding. The finishing operations of chasing, burnishing, plating, &c., are also parts of the founder's art. In this country, where metal-working is of so great importance in a commercial point of view, improvements are constantly being made in the operations of the foundry. The practice on the continent differs also in many respects from that pursued in our foundries; this but applies chiefly to details, as there is of course a general resemblance in the principles upon which the several processes are conducted.

Before entering upon the practical part of the subject a few preliminary remarks respecting the knowledge that existed of these arts in the earliest ages, may not be out of place; to show, at least, that founding is of very high antiquity. We trace it back, in the sacred writings, to the very infancy of the human race, where it is recorded that Tubal Cain was skilled in working in metals. In the patriarchal ages we have also the description, with their materials and weight, of the presents in earrings and bracelets that were offered to Rebekah by the servant of Abraham, with other allusions to similar objects of luxury, which prove that considerable progress must have been made in these arts, since there were artizans at that time who could execute works of such delicacy and minuteness as to be used merely for ornament. There is the same authority for the fact that the arts of metallurgy were known and practised very extensively by the early Israelites; and we have the names of two Hebrew artists who were so celebrated for their great skill in working in the precious and other metals as to be accounted divinely instructed. (Gen. xxiv., 22; Exod. xxxi., &c. &c.) There can be no doubt that the Egyptians were well acquainted with some very refined processes of founding long prior to any written historical record, and it is not unlikely that they may have been, to a certain extent, the instructors of the Israelites who were so long resident in their country. The Phœnicians, who possessed considerable knowledge in these arts, as may be judged from the fact stated in the sacred history, that when Solomon required skilful artificers to execute the decorations for the Temple, he obtained the assistance of a native of Tyre, 'who was cunning to work all works in brass—*cast*,' we are told, '*and wrought*.' (1 Kings, vii.) Homer also bears evidence to the well-known ability of this people in an epithet particularly applied to the Sidonians. The extent to which metal-working was employed by the Greeks, Etruscans, and Romans, and the excellence to which it was occasionally carried in the fine arts, are too well known to need further observation in this place: a general history of it, as a branch of sculpture, has already been given in the article BRONZE, which also contains some notices from the antient writers on the different methods adopted of solid hammer-working, hammer-work in plates, and in casting; as well as on the varieties and composition of metals. It must however be acknowledged that in all the practical points of antient founding our information is very limited, the writers of antiquity having confined themselves, generally, to a description of finished productions, and leaving us little or nothing by which we can judge of the mode of working.

It appears that furnaces of considerable size, and producing a great tonnage of metal, were constructed in this country as early as the reign of Queen Elizabeth; but it was not till the beginning of the seventeenth century that a revolution took place which effected a great change in the character and importance of founding. Prior to that date all the operations of melting, &c., had been performed by means of wood fuel; but the demand for various objects in metal was now so greatly increased that it was evident, first from the consumption of timber for the foundries, and next from the destruction of forests in consequence of the agricultural improvements which were taking place in various parts of the country, that this provision must soon prove insufficient to meet the wants of the trade. It was then that the attempt was made to bring coal into use, and it is curious at this time to know how much difficulty, first from ignorance of its real value in the operations of metallurgy, and then from prejudice against such an innovation upon the old habit of burning wood only, (to which must also be added the interference with the interests of wood monopolists,) was thrown in the way of its introduction. One of the earliest and most zealous advocates for its use, Dudley, had all his works destroyed, and was nearly ruined by the violence of his rivals, or rather opponents; but at length its employment was fully established, and from that time the rapid

advance of the iron and other metal works of this country may be dated.

We have stated the chief reason for having recourse to the coal-mines for fuel to have been the apprehension that the supply of wood fuel would fail; but for this well-grounded fear wood or charcoal would always have been preferred for many of the operations of metallurgy, from its being less objectionable, as regards its chemical composition, than coal. The iron that is smelted in Sweden by wood fuel is considered a superior article, and is still much sought after; and the smelters in this country find it necessary to *char* the pit and sea-coal which they use, in order to adapt it to the purposes required. There are various ways of making this charred coal, which is called coke or coak. The common process is to place a quantity of small coal or coal dust in a kiln heated with large coal: the small coal then runs together and forms a large mass which, when it is completely red, is pulled or drawn out in lumps with iron rakes and laid on the ground. It is spongy and porous in its texture, but it loses little or nothing of its valuable qualities, as it is only deprived by this process of its volatile parts, and nothing remains but the carbon and earthy impurities. Sometimes coke is made in the open air; ashes being thrown upon the mass which, after it has lost its volatile parts and emits no smoke, becomes red hot. The object of this covering is to prevent the access of air. Some years ago a plan was discovered and carried into effect for saving the volatile products of the coal which were lost by the processes hitherto adopted for making coke. By burning the coal in a range of stoves, with as little air as possible at the bottom, and conducting the smoke to a capacious close tunnel, the bitumen is condensed in the form of tar. This improvement upon the former method was discovered by Lord Dundonald. It is not necessary to enter into the niceties attendant on the methods employed for reducing the ores of different metals. Many of these details would be useless, except to the operative smelter; while others can only be known to those experienced in the several processes, and are perhaps scarcely communicable but by exhibiting them in practice. The following observations on the reduction of the ores of iron, tin, copper, and lead, the metals produced and worked in the greatest abundance in this country, must therefore be received as introductory to more complete information on the subject, to be acquired only from works of elaborate detail, or from personal examination of the process.

Iron is obtained from a very abundant ore in this country, viz. the common iron-stone of our coal-measures. It is found that for the reduction of the ore to a metallic state it is necessary to add a certain quantity of lime, which acts as a flux; and it is worthy of remark that, while the ore itself from which the metal is produced, and the coal for melting it, are found together, the limestone by which its reduction is facilitated usually abounds in the lower regions of the carboniferous strata, and sometimes, as in the great coal basin of South Wales, a bed of millstone grit capable of enduring the fire, and used in constructing the furnaces, is also found in connexion or alternating with the iron ore and limestone. 'In many coal-fields, the occurrence of rich beds of iron ore in the strata of the slaty clay that alternate with beds of coal, has rendered the adjacent districts remarkable as the site of most important iron foundries; and these localities usually present a further practical advantage, in having beneath the coal and iron ore a substratum of limestone that supplies the third material required as a flux to reduce this ore to a metallic state.' (Buckland, *Bridgewater Treatise, Geological and Mineral*, vol. i.) 'The occurrence of this most useful of metals,' says Mr. Conybeare, 'in immediate connexion with the fuel requisite for its reduction, and the limestone that facilitates that reduction, is an instance of arrangement so happily adapted to the purposes of human industry, that it can hardly be considered as recurring unnecessarily to final causes, if we conceive that this distribution of the rude materials of the earth was determined with a view to the convenience of its inhabitants.' The first operation the ore undergoes is *roasting*. This is done in various ways, both in this and in other countries. Sometimes it is conducted in kilns, sometimes on the ground, and in the open air. The first method is by heaping the iron ore on a mass of ignited coal. In the other, a thick layer of ironstone, broken in pieces, is placed upon a bed of coal, or wood, or charcoal (on the Continent wood or charcoal is always used), six or eight inches thick, and covering an area of several yards; upon this another layer of fuel is placed, and then another pile of ore, which diminishes both in area and thickness towards the top. The whole is then covered with small coal or charcoal dust till it reaches some feet above the ground. The lower stratum of fuel is then lighted, and by degrees ignites the whole mass. In the course of a few days the ironstone becomes cool, and the sulphur, arsenic, water, and inflammable matter being driven off, it is fit for smelting. It is then placed in a furnace, with fuel and limestone in determined proportions. At Dudley, in Staffordshire, for 2¼ tons of roasted ore, which affords a ton of cast metal, 19 cwt. of transition limestone are employed as flux. In the course of a few hours the whole runs down, and the iron is melted, and in that state is allowed to flow into furrows made in sand, where it forms what is termed *pig-iron;* or is poured into moulds where it forms the various articles of cast-iron ware. There are various sorts of cast-iron, but it is usually divided into three classes relatively to its colour and qualities, which are in this country called *numbers one, two,* and *three*, sometimes more descriptive names are given to the different qualities, as *smooth-faced, grey, white, forge pigs, ballast*-iron, &c., &c. Cast-iron is converted into *bar*-iron by smelting it by means of charcoal, when it is welded and hammered: of this there are also varieties, of which the toughest, called *stub*-iron, is used in forming fowling-piece barrels. It is made by inclosing old horse-shoe nails tightly in a broad iron ring, generally made of Swedish iron; a welding heat is then applied, and the whole mass is hammered till by degrees the nails and ring become completely united: it is then drawn into bars, which make an iron of peculiar closeness, toughness, and malleability. *Steel* is produced by a process called cementation, in which the iron is placed in alternate layers of charcoal, and heated for several days in a close furnace, and then suddenly cooled by plunging it in cold water.

The best ore of tin is found in Cornwall. It is commonly blasted by gunpowder, and is procured in pieces of considerable size, which are stamped to powder by beams shod with iron: it is then well washed till the earthy particles are carried off, and the tin is fit for the smelting house. After being roasted in a reverberatory furnace, and again washed, it is a second time subjected to the furnace, being now mixed with small coal, and, in some cases, with a small quantity of lime. The melted tin thus produced is at last placed in a small furnace and exposed to a very gentle heat, when the purest portion melts first and is drawn off. This is called *common grain tin*, and the inferior, which still contains a small proportion of copper and arsenic, is then cast into pigs called *block tin*. The finest grain tin is procured from the stream works of Cornwall. Good stream tin affords from 65 to 75 per cent. of the best *grain*.

The reduction of copper ore is made by several consecutive processes. The first is by calcining it, and when the ore is sufficiently *roasted* to oxidate the iron which it contains, it is melted. The melted metal is after a time suffered to flow into a pit filled with water, by which it becomes granulated. It then undergoes further heating, and what is called technically its *slag* (or scoria) is taken off, and it is again allowed to run off into water. After other nearly similar processes it is cast in sand, when it becomes solid, and in this state is called *blistered copper*. It is now fit for what is termed the refinery, and undergoes an operation called refining or toughening. This is considered to be an operation of delicacy, and requires great skill and care in the workmen. It is conducted in a furnace similar to the melting furnace, and the object is to thoroughly purify the metal from any portions of oxygen, which is performed by adding charcoal to the copper while it is in fusion, and stirring it occasionally till it is judged to be pure. When tin is united with copper, it forms the compound called *bronze;* and it is remarkable that when thus composed the specific gravity of the metal is always greater than would be deduced from the computation of the quantities and specific gravities of the component parts taken singly. The uses to which this valuable composition is applied in the fabrication of cannon, bells, statues, &c., &c., are well known. United with zinc, copper forms the compound called *brass*. It is not easy to effect this union by simple fusion; it is therefore usually done by cementation, when the granulated copper is combined with the vapour of zinc.

The greater part of the lead met with in England is procured from a substance called *galena*, in which it is found

combined with sulphur. There are, however, other ores of lead. The galena, being freed by hammering it and by the hand, from whatever impurities can be separated from it by those means, is broken up into small pieces, and after repeated washings is placed in a reverberatory furnace; but only sufficiently heated to drive off certain ingredients without melting the lead itself. The *roasting* being finished charcoal is added till the reduction is completed. The lead, after the *slag* has been removed from it, is suffered to run out of the furnace into a pan, and being first skimmed is ladled out into moulds and left to cool. There are various methods adopted in different places and under different circumstances for procuring metals from their ores.

The furnaces that are used in founding are chiefly of two kinds, and though strictly speaking both are *air* furnaces, yet they are distinguished as *air* or *wind* furnaces and *blast* furnaces. The first acts by a draught through a chimney. In the other the air is forced into the body of the furnace by means of bellows. The forms and relative proportions of the different parts of the furnace, and particularly the size, elevation, and direction of the chimnies, and the dimensions and space of the flues when these are required, are of great importance; the volume and intensity of heat and consequent certainty of the operations depending in a great measure on the knowledge and science displayed in adapting the parts to each other. The *blast* furnace was most probably known at a very early period. The old mode of working the bellows was by hand, or by cattle, or more usually by water-wheels; but the discovery of the power of steam, and the certainty and regularity of its action, have rendered its employment almost universal, at least in works of any extent. There is another variety of furnace to which allusion has been made in describing certain processes; it is called a cupol or cupola, and sometimes a reverberatory furnace. It is used for many operations in founding, and is often preferred for apeculiar application of heat different from those before mentioned. In this furnace the ore and fuel, or the metal and fuel, if it is used for casting, do not come in contact, but it is so contrived that the flame only shall pass over the material to be acted on. The reverberatory furnace is generally employed for smelting lead and copper ores and for refining some of the finer metals.

Founding is practised either in melting or casting any quantity of metal in the solid, or with a core (by means of which the metal is preserved of a determined thickness or substance), or in plain casting. Before any object can be cast in metal it is necessary that a model of it be prepared. The models may be made of various substances; clay or wax, or sand with clay, are those usually employed, but they may also be of wood, stone, or any other material. Upon those models *moulds* must be made; these are commonly composed of plaster of Paris mixed with brickdust, sometimes sand, or sand with a mixture of cow-hair. For moulds for iron and brass work a yellowish sharp sand is preferred, which is prepared by mixing it with water and then rolling it on a flat board till it is well kneaded and fit for use. This process is called, in technical language, *tewing*. If the object is cylindrical, or of a form that admits of it, it is moulded and cast in two pieces; these two parts are then carefully joined together, and the edges or seams carefully cleaned. This doubling is an easy and cheap mode of execution, and only requires care to be successful. For the smaller class of works, instead of melting and running the metal at once from a large furnace, earthen crucibles are used, into which the metal is thrown in small pieces: the crucible is placed in a strong heat in a close stove, and as the metal is melted and sinks more is added till the vessel is full. It is then lifted out by means of iron instruments adapted to the purpose, and the metal is poured from it into the moulds, in which channels or ducts for receiving it have been previously made. There is one great advantage in using crucibles, viz. that the metal may be carried in them to any part of the foundry, whereas in general it is essential to have the moulds and the furnace close together. It is obvious however that melting metal in crucibles can only be practised where the casting is on a comparatively small scale.

In noticing the different ways of casting, mention has been made of one in which a core is used, and which may require some explanation. The *core*, as its name denotes, is a part or portion situated within the body of the cast; and its purpose in founding is to form a centre to the work by which the thickness or substance of the metal may be regulated. In coring, the mould must first be made complete; into this, clay or wax, or any other fit substance or material, is then squeezed or pressed in a layer of uniform thickness; in large works it is usually from half an inch to an inch thick. This layer represents the metal. The mould, if in parts, is then to be put together, the abovementioned layer being left within it, and into the open space in the centre a composition (usually of plaster of Paris with other substances mixed with it) is introduced, and made to adhere to, or rather is filled up to the clay or wax. This is the core, and it is often made to occupy the whole interior of the mould. When this is *set*, or dry, the mould is taken to pieces and the material which has been made to represent the metal removed. The mould is then again put carefully together round its core or nucleus, the two portions being secured from contact by stops and keys properly arranged for that purpose. It is now obvious that when the mould is placed, with its channels and ducts, to receive the metal, this latter can only enter the interstice or space between the outer *mould* and the inner *core;* and thus, by an ingenious and simple contrivance, the cast is insured of sufficient substance to answer every object required, with, at the same time, a great saving of metal and reduction of weight.

In all these operations it is essential that the mould and the cores be perfectly free from moisture, as the sudden and violent expansion of air that is at all damp, upon the heated metal flowing into the mould, would cause it to burst, to the destruction of the work and the great danger of the workmen. In order to guard against this, the moulds and core are usually placed in an iron closet or drying-stove in which large fires are constantly kept up, and from whence they are not removed till it is ascertained that they are perfectly dry, and just before they are required for being cast into. The moulds and cores of works of large dimensions are usually strengthened with bars and hoops of iron, to prevent their springing or changing their form during the drying, and during the necessary moving and shifting about in the foundry. All that is now necessary before casting is to cut the channels or ducts for the metal to penetrate easily and quickly into the mould; and to place the mould conveniently with respect to distance and inclination from the furnace. The first operation is easily performed; the founder takes care to distribute the channels, both in number and in their size (or width), according to the parts of his work into which he requires a greater or less volume of metal to flow, and also, if the object is of great extent or complicated form, that the different parts of the mould may as nearly as possible be filled simultaneously; it being most desirable that the *whole getto*, or cast, should be made before the metal in any of the parts has time to settle or lose its fluidity. Other channels are also made for allowing the air to escape as the melted metal enters the mould; these are called vents, and are very necessary where the works are on a considerable scale. With respect to placing the mould, it is only important to secure a sufficient inclination of plane from the mouth of the furnace to the mould that the metal may run easily and uninterruptedly, and not have time to grow cool and therefore sluggish. The usual method in great bronze works is to bury the mould in a pit a little below the level of the furnace, and by ramming sand firmly round it to insure its not being affected by any sudden or violent shock, or by the weight of metal running into it. When every thing is ready and the metal found to be in a state fit for running, the orifice or mouth of the furnace (which is usually plugged with clay and sand) is opened, when the metal descends, and in a few minutes the mould is filled. The metal is allowed to run till it overflows the mouths of the channels into the mould. The work is then left to cool, after which the mould is scraped or knocked off and the cast undergoes the necessary processes (such as cleaning, chasing, &c.) to render it fit for the purpose designed.

Brass ordnance is always cast solid. The model is made round a nucleus of wood called a spindle, and the mould of loam and sand made over it. When this is perfectly dry, the model and spindle within are removed, and the mould is subjected, as in the instances before described, to a strong heat, till it is well dried or baked. When ready for casting, it is placed upright in the pit, and the metal is allowed to run into it till it is filled. What is called a dead head is left at the upper and smaller or mouth end of the gun, which presses the metal down, and prevents its becoming porous as it settles and cools. After a few days the mould is knocked off, and the gun is ready for finishing. The dead head is turned off, and the boring, which is an operation requiring

great care and skill to insure its being true, is effected by a machine adapted to the purpose. Wood fuel is used for this branch of founding, but the furnace is a reverberatory, and the flame, and not the fuel, comes in contact with the metal. The composition for brass ordnance is 90 copper and 10 tin in 100 parts.

In ordnance-casting in France the proportion of copper is greater, being stated at 100 copper to 11 of tin, which is about the composition of the bronze of which medals are formed. Metal casts usually require a good deal of working over after they are freed from the mould; this depends however upon the quality of the object, and also on the degree of success in the casting. These operations are chasing, burnishing, lackering, plating, gilding, &c.

Chasing is performed by scraping with edged tools and by filing till any portions of the work which may have become heavy or indistinct in the casting, or were not highly finished in the model, are rendered sharp and clear. Many patterns for ornamental work, as foliage, flowers, and such devices, are cast roughly, and are afterwards placed in the chaser's hands, who completes them for use.

Burnishing consists in making the raised parts of the design complete. It is effected by rubbing rather than cutting. The usual mode of operating is by fastening the object down in a vice, and working up the face with tools of various sizes formed of a shaft of steel fixed in a wooden handle. These tools are slightly turned up at the end. This operation is also called heightening. The workman occasionally dips his instrument in a lacker. The operation of producing embossed or vilicort work by pressure from behind is called punching; the term snarling is also used for a branch of this work.

Lackering is employed both for use and ornament. It gives to brass work the bright yellow colour generally seen in articles of general use, as door-plates, handles, hinges, &c.; and it also preserves metal from tarnishing or turning black by exposure to the air. The lacker is made of alcohol and seed or shell lac, with spirits of saffron, arnotto, or turmeric for colouring matter; it is laid on lightly with a soft brush, the object to be lackered being first warmed; when perfectly dry, the surface is rubbed.

Soldering is the operation of uniting metallic bodies with each other, which can only be done by means of simple or mixed metals. Solders are distinguished into two kinds, viz. hard and soft. Hard solders are ductile, and will bear hammering; that used for brass is made of brass with one-sixth, one-eighth, or even one half of zinc; this may also be used for the hard solder of copper. It is called and sold as spelter solder. Soft solders are easily melted, but are brittle and will not bear hammering. These are made of tin and lead in equal parts; or bismuth, tin, and lead in like proportions. Iron is often soldered with copper, and copper and brass with tin, especially in large works. In the operation of soldering the surfaces of the metal intended to be joined must be perfectly clean and applied closely to each other. The solder is then laid upon the joint, with a small quantity of sal ammoniac or borax or common glass: these additions defend the metal from oxidation. For the operation of GILDING, see that article.

FOUNDLING HOSPITALS are charitable institutions, which exist in most large towns of Europe, for taking care of infants forsaken by their parents, such being generally the offspring of illegitimate connexions. These institutions date from the Middle Ages, and were established for the purpose of preventing the destruction of children either by actual violence or by being exposed in the streets or highways. Among the Romans and other nations of antiquity, the exposure of children by poor or unfeeling parents was a frequent practice, and was not punished by the laws. After Christianity became the religion of the empire, it was forbidden by the Emperors Valentinian and Gratian. At the same time, the greater strictness of the laws concerning marriage and against concubinage, the religious and moral denunciations against unwedded intercourse, and afterwards the obligatory celibacy introduced among the clergy, and the severe penalties attending its infraction, all tended to increase the danger to which illegitimate infants were exposed from the sentiments of fear and shame in their parents. Child-murder and the exposure of children became nearly as frequent in Christian countries as they had been in Heathen times, only the parents took greater care to conceal themselves; and humane individuals in various countries began to devise means to collect and provide for the forsaken infants found in the streets. In this, as in other acts of charity, ecclesiastics stood foremost. At Rome, Innocent III., in 1198, when rebuilding and enlarging the great hospital of S. Spirito, allotted a part of it to the reception of foundlings, several infants having been found drowned in the Tiber about that time. This asylum for the 'esposti,' or foundlings, was afterwards enlarged and endowed by subsequent popes, and the institution was adopted by degrees in other cities. It was thought that by providing a place where mothers might deposit their illegitimate children in safety without being subject to any inquiry or exposure, the frequent recurrence of the crime of child-murder would be prevented. For this purpose a turning box was fixed in an opening of the wall in a retired part of the building, in which the child being deposited by the mother in the night and a bell being rung at the same time, the watch inside turned the box and took the infant, which from that moment was placed under the protection of the institution, was nursed and educated, and afterwards apprenticed to some trade or profession. Those parents who were in hopes of being able to acknowledge their child at some future time, placed a mark or note with it, by which it was afterwards known when they came to claim it, and it was then restored to them on their defraying the expense incurred for its maintenance.

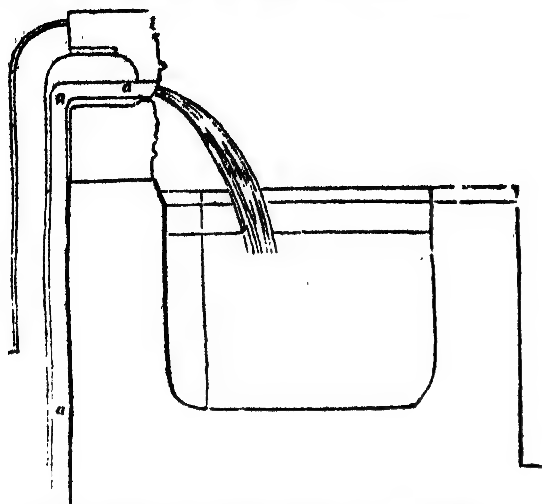
In France the philanthropist Vincent de Paule, the founder of the Society of the Missions in the first half of the seventeenth century, exerted himself to found an asylum for infants, which were at that time frequently left to perish in the streets of Paris. It was at first supported by private subscriptions, but afterwards was made a national establishment—'Hôpital des Enfans trouvés.' Similar institutions were founded in other great French cities. In 1831 there were 71,411 illegitimate children born in France—about one-thirteenth of the whole number of births;—but in Paris the proportion is much greater, being one illegitimate child in every three births. Of the whole number of illegitimate children, about 58 out of every 100 are abandoned by their mothers and taken to the foundling hospitals, where nearly two-thirds of them die before they are a year old. (Guerry, *Statistique Morale de la France.*) Mortality appears to be very great in most foundling hospitals of the continent, owing to carelessness, mismanagement, or want of sufficient funds for the administration of those institutions. The infants are given out to cheap nurses in the country, where a great number of them die. At the same time, it is remarkable that the number of illegitimate births has greatly increased over all Europe during the last forty years. (Benoiston de Châteauneuf, *Considérations sur les Enfans trouvés dans les principaux Etats de l'Europe*, 1824.)

The principal objection that has been raised against foundling hospitals is, that they tend to encourage the procreation of illegitimate offspring. On the other side, they are supposed to have the effect of preventing in a great measure child-murder. The whole of this question, in all its bearings, is extremely difficult to solve. One distinction ought to be made, namely, that in countries where there is no legal provision for the poor, foundling hospitals appear to be more necessary, or at least less objectionable, than in those where the mothers of illegitimate children, if unable to support them, have, like other destitute persons, the resource of the parish poor-house. It must also be observed that mothers of illegitimate children often neglect their unfortunate offspring, and are ill calculated by their habits to rear them up so as to make of them useful and honest members of society.

FOUNTAIN, a jet or jets of water, flowing either naturally out of the earth, or from structures formed by art. Artificial fountains consist of water flowing from statues, vases, or architectural buildings combined with sculptured figures and other ornamental decorations.

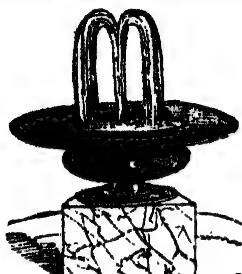
Many antient Greek cities were decorated with fountains. Pausanias informs us that Corinth was adorned with several fountains, and he mentions one in particular which stood near the statue of Diana, representing Pegasus, with the water flowing through his feet (ii. 3, 5). He describes another as consisting of a bronze Neptune seated on a dolphin, from the mouth of which the water issued (ii. 2, 8). Frontinus, who lived in the reigns of Nerva and Trajan, was superintendent of the fountains at Rome, and wrote a work, 'De Aquæductibus Urbis Romæ Commentarius,' in which he treats, among other things, of the distribution of the

waters of fountains. The public fountains of Pompeii, some of which are almost perfect, evince the knowledge which the antients possessed of the property of water to rise to its level, and their practical application of the principle.



Section of Fountain, from Pompeii, showing the ascending pipe, a, a, a.

Not only were the streets, but even the private houses of the Pompeians, decorated with fountains; and it appears that the antients were acquainted with that law by which fluids may be made to ascend in a vertical jet to a height proportionate to the pressure which acts upon them.



Fountain, from the paintings of Pompeii.

One of the domestic fountains of the Pompeians is encrusted with coloured glass and shells. The fountain of water flowed from a large mask set on steps, placed within a large niche.

'At Rome, the proper distribution of the rivers which flowed through her aqueducts was a matter of great importance, entrusted to the care of an officer of very high rank. It appears from Frontinus, who filled that office under the Emperor Nerva, that the letting out of the public waters to private persons was a source of revenue; and from his numerous complaints of fraud, and directions to prevent it, we learn something of the manner of distribution. The aqueducts were each charged with a certain number of pipes of supply; and no new pipe could be inserted without a special application to the emperor. Permission being obtained, the overseer assigned to the applicant a calix, as it was called, of the assigned dimensions. This was a brass measure (modulus) fixed in the castellum or reservoir, the diameter of which regulated of course the quantity of water which passed through it. It was ordered to be made of brass, that it might not easily bend, and that there might be less room for fraud, either on the public or the individual, by enlarging or diminishing the prescribed aperture. Beyond the calix the pipe was private property; but more effectually to prevent fraud, it was enacted, that for fifty feet from the calix the pipe and it were to be of the same dimensions; and to prevent the breaking up of the public pipes, it was expressly provided that every person should draw his water direct from one of the castella, or reservoirs in which the aqueducts terminated. The right to a supply of water was strictly personal, not attached to houses, so that the supply was cut off at every change of ownership. The waters which had once been granted were sold by the superintendents, as they fell in, to the highest bidders. Those whose means or interest were insufficient to obtain a private pipe, were obliged to fetch water from the public fountains.' (*Pompeii*, vol. ii. pp. 73, 74.)

The number of leaden pipes found in Pompeii leads us to conclude that they were universally employed in fitting up the fountains of that city. Some fountains flowed through bronze figures, of which several are preserved in the Museum at Naples.

Some of the cities of Italy and the East are adorned with fountains, which are no less agreeable to the eye than useful to the inhabitants. Of all places in the world none appear to be so abundantly furnished with this agreeable convenience as modern Rome, though this profusion is most probably only a tithe of the luxury with which the antient city was supplied. Many of the fountains of Rome are highly decorated, of great magnitude, and very varied in their mode of ejecting the waters with which they are supplied from the existing aqueducts. The fountains of Trevi, and the Pauline fountain at San Pietro in Montorio, are immense piles of architecture, the former highly decorated with sculpture. In Italy, almost every species of design which the imagination can form has been adopted by their ingenious artists in the construction of fountains.

The city of Paris is well supplied with fountains, many of which are elegantly designed. The fountains of Versailles and St. Cloud in France, and the fountains at Wilhelmshöhe near Cassel, are the largest in Europe. London, though well supplied with water, is almost destitute of fountains.

FOURCROY, ANTOINE-FRANÇOIS DE, an eminent French chemist, councillor of state, commander of the legion of honour, member of the Institute, and of most of the academies and scientific societies of Europe, professor of chemistry at the Museum of Natural History, at the Faculty of Medicine of Paris, and at the Polytechnic School, was born at Paris, on the 15th of June, 1755, and was the son of Jean-Michel de Fourcroy and Jeanne Laugier.

His family had long resided in the capital, and several of his ancestors had distinguished themselves at the bar. Antoine-François de Fourcroy sprung from a branch of the family that had gradually sunk into poverty; and his son, the subject of the present article, grew up in the midst of it. When seven years old, he lost his mother, and his sister preserved him with difficulty till he went to college; and in consequence of the ill treatment of a master he left it at fourteen years of age, somewhat less informed than when he went to it.

He entertained various projects for obtaining a livelihood. While uncertain what plan to follow, the advice of Vicq-d'Ayr, who was a celebrated anatomist and a friend of his father's, induced him to commence the study of medicine; and after successfully struggling against every kind of difficulty, he at last obtained the necessary qualification to practise in Paris.

The first writings of Fourcroy did not evince any peculiar predilection for any particular branch of science; he wrote upon natural history, anatomy, and chemistry; he published an 'Abridgment of the History of Insects,' and a 'Description of the Bursæ Mucosæ of the Tendons;' and in consequence of the celebrity which he acquired by the last-mentioned performance, he was admitted as an anatomist into the Academy of Sciences in 1785.

After the death of Macquer, which happened in 1784, he succeeded to the chair of professor of chemistry at the Jardin du Roi, and he continued there till his death, which took place 25 years afterwards. He was greatly admired for the eloquence with which he delivered his lectures, and the writer of this article was a witness of his great flow of language during a sitting of the Institute in 1802.

In 1795 he was elected a member of the National Convention, but notwithstanding his reputation for eloquence he never opened his mouth in the Convention till after the death of Robespierre: prudential motives induced him to resist the temptation of exhibiting his talents while the tyrant reigned, although he was well known to be a determined enemy to the old order of things, from which indeed his father and himself also had severely suffered.

After the 9th Thermidor, when the nation was wearied with destruction, and efforts were making to restore institutions which had been overturned, Fourcroy began to acquire influence, and he took an active part in whatever related to the establishment of schools, whether of me-

dicine, or for the purposes of general instruction. Among these was the Polytechnic School, at which, as already stated, he was professor of chemistry; and both as a member of the Convention and of the Council of Antients, he was concerned in the establishment of the Institute and the Museum of Natural History.

The great exertions made by M. de Fourcroy, and the prodigious activity which he displayed in the numerous situations which he filled, gradually undermined his constitution; he was sensible of his approaching death, and announced it to his friends as an event which would speedily take place. On the 16th of December, 1809, after signing some dispatches, he suddenly exclaimed—'Je suis mort;' and fell lifeless on the ground.

M. de Fourcroy was twice married; by his first wife he left a son, an officer in the artillery, who inherits his title, and a daughter, Madame Foucaud.

In his 'History of Chemistry,' Dr. Thomson thus concludes his notice of the works of Fourcroy:—'Notwithstanding the vast quantity of papers which he published, it will be admitted, without dispute, that the prodigious reputation which he enjoyed during his lifetime was more owing to his eloquence than to his eminence as a chemist; though even as a chemist he was far above mediocrity. He must have possessed an uncommon facility of writing. Five successive editions of his 'System of Chemistry' appeared, each of them gradually increasing in size and value: the first being in two volumes and the last in ten. This last edition he wrote in sixteen months: it contains much valuable information, and doubtless contributed considerably to the general diffusion of chemical knowledge. Its style is perhaps too diffuse, and the spirit of generalizing from particular and often ill authenticated facts, is carried to a vicious length. Perhaps the best of all his productions is his 'Philosophy of Chemistry.' It is remarkable for its conciseness, its perspicuity, and the neatness of its arrangement.'

Besides these works and the periodical publication entitled 'Le Médecin éclairé,' of which he was the editor, there are above one hundred and sixty papers on chemical subjects, with his name attached to them, which appeared in the Memoirs of the Academy and of the Institute; in the 'Annales de Chimie,' or the 'Annales do Musée d'Histoire Naturelle,' of which last work he was the original projector. Many of these papers contained analyses, both animal, vegetable, and mineral, of very considerable value. In most of them the name of Vauquelin is associated with his own as the author, and the general opinion is that the experiments were all made by Vauquelin, but that the papers themselves were drawn up by Fourcroy.

It would serve little purpose to go over this long list of papers. Though they contributed essentially to the progress of chemistry, yet they exhibit but few of those striking discoveries which at once alter the face of the science by throwing a flood of light on every thing around them. We shall merely notice a few of what we consider his best papers.

1. He ascertained that the most common biliary calculi are composed of a substance similar to spermaceti. During the removal of the dead bodies from the burial-ground of the Innocents at Paris, he discovered that the bodies were converted into a fatty matter, which he called *adipocire*. It has since been distinguished by the name of cholestrine, and has been shown to possess properties different from those of adipocire and spermaceti.

2. It is to him that we are indebted for the first knowledge of the fact, that the salts of magnesia and ammonia have the property of uniting together and forming double salts.

3. His dissertation on the sulphate of mercury contains some good observations. The same remark applies to his paper on the action of ammonia on the sulphate, nitrate, and muriate of mercury. He first described the double salts which are formed.

4. The analyses of urine would have been valuable had not almost all the facts contained in it been anticipated by a paper of Dr. Wollaston published in the 'Philosophical Transactions.' It is to him that we are indebted for almost all the additions to our knowledge of calculi since the publication of Scheele's original paper on the subject.

5. We may mention the process of Fourcroy and Vauquelin for obtaining pure barytes, by exposing nitrate of barytes to a red heat, as a good one. They discovered the existence of phosphate of magnesia in the bones, of phosphorus in the brain, and in the milts of fishes, and a considerable quantity of saccharine matter in the bulb of the common onion, which, by undergoing a kind of spontaneous fermentation, was converted into manna.

In these and most other similar discoveries which we think it unnecessary to notice, we do not know what fell to the share of Fourcroy and what to Vauquelin; but there is one merit at least to which Fourcroy is certainly entitled, and it is no small one: he formed and brought forward Vauquelin, and proved to him ever after a most steady and indefatigable friend. This is bestowing no small panegyric on his character; for it would have been impossible to have retained such a friend through all the horrors of the French revolution if his own qualities had not been such as to merit so steady an attachment.

In concluding, we may remark that this circumstance, coupled with the well-known fact of his having saved the lives of some men of merit, and among others, of Darcel, tend greatly to acquit Fourcroy of the disgraceful charge which has been made against him of having contributed to the death of the illustrious Lavoisier. This acquittal is rendered complete by the annexed declaration of Cuvier in his Eloge of Fourcroy:—'If, in the rigorous researches which we have made, we had found the smallest proof of an atrocity so horrible, no human power could have induced us to sully our mouths with his Eloge, or to have pronounced it within the walls of this temple, which ought to be no less sacred to honour than to genius.'

FOURIER, JOSEPH. The biographical part of this article rests on the authority of M. Cousin's notes to his *éloge* of Fourier (Paris, 1831).

Joseph Fourier was born at Auxerre in 1768: he was the son of a tailor in that town, and there received his education at a school directed by the Benedictines. Into this order he was about to enter, and had passed a part of his noviciate, when the Revolution commenced. He had applied himself very early to the mathematics, and had gained such reputation that in 1789 he was appointed professor in the school at which he had formerly studied. He had not confined himself to one branch of learning, as appears from his giving courses of history, rhetoric, and philosophy. Before this time, in 1787, he had sent to Paris a memoir on the theory of equations, to be presented to the Academy of Sciences. This memoir contained the first steps of the theory which was afterwards published: it was lost during the Revolution, but a sufficiently attested copy exists.

Fourier took some part in the civil troubles, at their commencement, and was a member of the Committee of Public Safety at Auxerre. He was more than once the object of proscription, having been twice either saved or delivered from prison by his fellow-townsmen of Auxerre, once saved from the guillotine by the death of Robespierre, and once by the interference of the professors of the Ecole Polytechnique. Having previously been a pupil of the Ecole Normale, he was appointed a sub-professor of the Polytechnic School in 1794, and remained in that post till 1798. In the latter year Monge proposed to him to accompany the expedition to Egypt. His occupations in that country were various: he was secretary of the Institute which was formed at Cairo, he superintended the commission which was employed in collecting materials for the great work on Egypt, and was employed in judicial and diplomatic capacities. At his return from Egypt he was appointed by the first consul prefect of the department of Isère, which place he continued to fill till 1815, his situation having been preserved to him at the fall of Napoleon in 1814, by the high estimation in which he was held, and the gratitude of those adherents of the old monarchy whom he had served. When Napoleon, in 1815, passed through Grenoble (a town of Fourier's prefecture), Fourier, who had hesitated much, issued a moderate Bourbonist proclamation, and left the town by one gate as Napoleon entered it by another. Napoleon was extremely enraged at this step, and causing Fourier to be brought into his presence, reminded him in strong terms of former benefits, and telling him that, after the proclamation, he could not remain at Grenoble, appointed him prefect of the department of the Rhône. Fourier appears to have been softened by the matter, or subdued by the manner, of Napoleon's address to him, and went quietly to his new post. He resigned it however on the 1st of May, in consequence of his determination not to execute the orders of Carnot, which required him to make numerous arrests among the Bour-

bonites; and he was in Paris when the news of the battle of Waterloo arrived. Here he remained for some time, entirely neglected, and with very moderate funds, until his former pupil, M. de Chabrol, gave him the superintendence of a *bureau de statistique*. In 1816 he was chosen a member of the Institute, but Louis XVIII. refused to ratify the election, and it was not till a year after that this king could be induced to allow it. On the death of Delambre he was chosen secretary of the Academy, and on that of Laplace president of the council of the Polytechnic School. Fourier died at Paris in May, 1830.

The character of Fourier was in every point of view respectable. His appearance and manners were decidedly good, and his address, united with the respect which he created, enabled him to manage the prejudices and passions of others to a remarkable extent, of which M. Cousin gives several instances. He knew how, says the last-named gentleman, 'prendre chacun par où il était prenable;' and his own explanation of this faculty was 'je prends l'épi dans son sens, au lieu de le prendre à rebours.' The influence of his conversation produced in one case at least abiding and remarkable effects: it was he who first gave a taste for Egyptian antiquities to the Champollions.

The writings of Fourier consist of papers in the Memoirs of the Academy of Sciences, the 'Annales de Physique,' and the 'Récherches Statistiques sur la Ville de Paris,' &c., as well as of two separate works, namely, the 'Théorie de la Chaleur,' Paris, 1822, and the 'Analyse des Equations déterminées,' Paris, 1831. The last work is posthumous, and was completed under the inspection of M. Navier.

In the first of the two works, the object of which is the deduction of the mathematical laws of the propagation of heat through solids, Fourier extended the solution of partial differential equations, gave some remarkable views on the solution of equations with an infinite number of terms, expressed the particular value of a function by means of a definite integral containing its general value (which is called *Fourier's Theorem*), &c. This work is full of interesting details, and is one of the highest productions of analysis of our day.

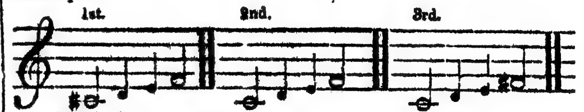
The latter of the two works contains an extension of Descartes' well known rule of signs, by means of which the number of the real roots of an equation may be determined. Considered with respect to results merely, the method of Fourier may perhaps be considered as superseded by the remarkable theorem of M. Sturm; but there is nevertheless much in the course marked out by Fourier, which it would be worth while to examine. The work also contains a method of solving equations by determination of the successive figures of the root, analogous to that proposed by Mr. Horner and others. The preface of M. Navier contains attestations as to the time at which the several parts of the work were written, which it will be worth the while of those to consult, who think that 'all which has been done by Fourier was virtually done by Mr. Horner long before.' The treatise of Fourier, published by M. Navier, is only the first part of the work: the remainder has not yet appeared, to our knowledge. A full account of its principal points will be found in Mr. Peacock's report on Analysis to the British Association.

FOURMO'NT, ETIE'NNE, born at Herbelay, near Paris, in 1683, was the son of a surgeon: he studied in several colleges at Paris, and showed an early and extraordinary facility for learning languages. He made himself master of the Latin, Greek, Hebrew, Syriac, and Arabic, and was appointed professor of the last-mentioned language in the College Royal of Paris. In 1715 he was made a member of the Academy of Inscriptions and Belles Lettres, and afterwards of the royal societies of London and Berlin. A young Chinese named Hoan-ji having been brought to Paris by the missionaries, Fourmont was appointed to assist and direct him in the compilation of a Chinese grammar and dictionary. After a few years Hoan-ji died, and left to Fourmont only very scanty materials for the intended work. Fourmont prosecuted the labour alone, and after several years he published his 'Meditationes Sinicæ,' 1737, which contain a kind of introduction to the Chinese grammar. Five years later he brought forth the grammar itself, which had cost him twenty years of study: 'Linguæ Sinarum Mandarinicæ Grammatica duplex, Latine et cum Characteribus Sinensium,' fol., 1742. Fourmont availed himself of the suggestions of several Jesuits, and he is said to have borrowed from Father Varo's 'Arte de la Lengua Mandarina,' printed at Canton in 1703, which was little known in Europe. He also compiled a catalogue of the Chinese MSS. in the king's library at Paris. Peter the Great having forwarded to the Academy of Inscriptions some fragments of a Tibetan MS. found by the Russian soldiers, Fourmont deciphered it, and his version is given in Boyer's 'Museum Sinicum.' His 'Reflexions sur l'Origine, l'Histoire, et la Succession des Anciens Peuples, Chaldéens, Hebreux, Phéniciens, Egyptiens, Grecs, &c., jusq'au tems de Cyrus,' were published after his death in 2 vols. 4to, Paris, 1747, with a biographical notice of the author. He wrote numerous other works, dissertations, memoirs, some of which appeared in the 'Memoirs of the Academy,' others were published separately, and many he left in MS. He published himself a catalogue of all his works in 1731, which then amounted to about 120, but many of them were mere unfinished sketches. Fourmont was not extremely modest, and was fond of speaking in praise of his own erudition, which was undoubtedly very extensive. He died at Paris, in December, 1745.

FOURMO'NT, MICHE'L, younger brother of Etienne, born in 1690, exhibited also a facility for learning languages; he assisted his brother in his philological labours, was made professor of Syriac in the College Royal in 1720, and he gave also from his chair lectures on the Ethiopic language. In 1726, being sent by the government to Greece to purchase MSS. and copy inscriptions, he gathered a rich harvest of both. He boasted of having copied more than 1000 inscriptions, chiefly in Attica and the Peloponnesus, which had escaped the researches of Spon and Wheeler and other travellers. These copies were deposited in the royal library at Paris. Many of these inscriptions are authentic, but others are forgeries, although Raoul Rochette (*Lettres sur l'Authenticité des Inscriptions de Fourmont*, Paris, 1819) defends their authenticity. In his letters to Freret and Count Maurepas, Fourmont boasts of having defaced or destroyed the remains of antiquity of several cities of Greece, and among others those of the temple of Jupiter at Amyclæ, a boast as unmanly as it is false, or at least absurdly exaggerated. (Dodwell, *Tour through Greece*, vol. ii. ch. 11.) He died in 1746, having published only some detached papers in the 'Memoirs of the Academy of Inscriptions,' of which he was a member. His nephew, Claude Louis Fourmont, who had accompanied him to Greece, returned to the Levant, and remained several years in Egypt. On his return to France, he published a 'Description historique et géographique des Plaines d'Heliopolis et de Memphis,' 12mo, 1755. It is a sensible, unpretending little work, and gives a satisfactory account of the condition of Egypt at the time. The author died in 1780.

FOURNIER. [CREEPER, Vol. viii. p. 148.]

FOURTH, an interval in music, and to be enumerated among the discords; though it seems to have puzzled many writers on music, some of whom are much inclined to view it as a concord. [CONCORD.] Its ratio is 4 : 3. Of fourths there are three kinds: the *Diminished Fourth*, the *Perfect Fourth*, and the *Extreme Sharp*, or *Superfluous Fourth* (called also the *Tritonus*, from being composed of three whole tones). The first (C ♯, F) is composed of a whole tone and two semitones; the second (C, F) of two whole tones and a semitone; and the third (C, F ♯) of three whole tones. Example:—



FOVEO'LIA. [MEDUSA.]

FOWEY. [CORNWALL.]

FOWLING, the act or art of taking birds with nets, by shooting, snares, the use of bird-lime, or other devices. It is also sometimes used for the taking of birds with hawks and falcons, more properly called falconry. In Latin this sport is termed Aucupium. See Bargæus *de Aucupio*, liber i., *ad Franciscum Medicem Florent. et Senens. Principem*, 4to. Flor. 1566. Olina's *Vecelliera*, 4to. Rom. 1684, is another work on fowling, the plates of which, representing the different modes of following the sport, are extremely curious. In English we have Blore's *Gentleman's Recreations*, fol. Lond. 1686 and 1716; and *The Experienced Fowler, or the Gentleman's Recreation*, 16mo. Lond. 1704.

FOX, *Vulpes*, Brisson, the generic name for a species of

that subdivision of the great genus *Canis* which has the pupils of the eyes elliptical or almost linear by day, though they become round or nearly so in the hours of darkness.

Genus Vulpes.

Although the dental formula and general osteological character of the *Foxes* agree with that of the true *Dogs*, the lengthened and sharp-pointed muzzle, the round head, the erect and triangular ears, the form of the pupil, the long body, short limbs and elongated, thick, and bushy brush, constitute differences which separate the former from the latter, at least sub-generically.

EUROPEAN FOXES.

The *Common Fox*, *Vulpes* of Ray, *Canis vulpes*, and *Canis alopex* (the latter the variety, if variety it may be called, with the tip of the tail black?) of Linnæus, *Vulpes vulgaris* of Brisson, *Volpe* of the Italians, *Raposa* of the Spanish, *Rapoza* of the Portuguese, *Fuchs* of the Germans, *Vos* of the Dutch, *Raff* of the Swedes, *Rev* of the Danes, *Tod* of the Scotch, *Llwynog*, fœm. *Llwynoges* of the Welsh, is too well known to require description. The time of gestation may be taken at from sixty to sixty-five days, and the birth of the young takes place in April. In a year and a half they attain their full size, and have been known to live thirteen or fourteen years; but as this can only have been ascertained, observes Mr. Bell, of individuals in confinement, it is very probable that, in a state of nature, it considerably exceeds that period. Of its cunning much has been said and a great deal of it is true. The reader will find some interesting remarks on the habits and economy of the common fox by Dr. Weissenborn in the number of Loudon's *Magazine*, (N. S.) for October, 1837.

Geographical distribution.—The *Common Fox* inhabits, according to Linnæus, Europe, Asia, and Africa.* Cuvier mentions it as reaching from Sweden to Egypt, both inclusive. Mr. Strickland notes it as occurring near Smyrna. The fox named *Melanogaster* by the Prince of Musignano in his *Fauna Italica* is probably a variety only. The strong smell proceeding from the anal glands and urine of the common fox is very offensive.

AMERICAN FOXES.

The *American Fox*, *Vulpes fulvus*, which is, according to Dr. Richardson, very plentiful in the wooded districts of the fur countries, about eight thousand (skins) being annually imported into England from thence, bears a strong resemblance to the common European fox, and, until De Beauvois pointed out its peculiarities, was considered identical with it. Thus it is the *European Fox* of Pennant. Dr. Richardson observes that the *American* or *Red Fox* does not possess the wind of its English congener, its strength being exhausted by the first short burst, though it runs about a hundred yards with great swiftness, and is soon overtaken by a wolf or a mounted huntsman. He gives the following synonyms:—*European Fox* of Pennant; *Red* or *Large Fox* of Hutchins; *Large Red Fox* of the plains, of Lewis and Clark; *Renard de Virginie* of Palisot de Beauvois; *Canis fulvus* of Desmarest; *Red Fox* of Sabine (Franklin's *Journ.*), and Makkeeshew of the Cree Indians.

Dr. Richardson is inclined to adhere to the opinion of the Indians in considering the *Cross Fox* of the fur traders (*Renard barré ou Tsinantontonque* of Sagard Theodat.; *European Fox*, var. *β. Cross Fox* of Pennant; *Canis decussatus* of Geoffroy, Sabine, and Harlan; *Cross Fox* of the Hudson's Bay Company's lists; *Beloduschki* of the Russians;) to be a mere variety of the *Red Fox*. He also considers the *Black* or *Silver Fox* (*Renard Noir ou Hayuha* of Sagard Theodat.; *European Fox*, var. *a. Black* of Pennant; *Renard Noir ou Argenté* of Geoffroy; *Grizzle Fox* of Hutchins, MSS.; *Renard Argente* of F. Cuvier; *Canis Argentatus* of Desmarest, Sabine, and Harlan; the *Black* or *Silver Fox* of Godman; *Tschernoburi* of the Russians;) to be another variety of the same. F. Cuvier doubts the identity of the American species with the *Black Fox* of the north of Europe.

Our limits will not permit us to give more than a few examples of the genus, and we select the *Arctic Fox*, *Vulpes Lagopus*, as the American species of whose manners the most interesting accounts have been given.

Description.—The Arctic Fox is considered by Dr. Richardson to be identical with the *Pied Foxes* of James; *Canis Lagopus* of Linnæus and Forster, Captain Sabine, Mr. Sabine, Dr. Richardson, and Dr. Harlan; *Arctic Fox* of Pennant and Hearne; *Greenland Dog* of Pennant? a young individual; *Isatis* and Arctic Fox of Godman; *Stone Fox* of authors; *Terreanee-arioo* of the Esquimaux of Melville Peninsula; *Terieniak* of the Greenlanders; *Wappeeskeeshew-makkeeshew* of the Cree Indians, and *Peszi* of the Russians.

Winter Dress.—The winter dress of the *Arctic Fox*, which when full grown measures about 3 feet 3 inches from the point of the nose to the tip of the tail, is entirely pure white, or white with a slight tinge of yellow, except at the tip of the tail, where there are a few black hairs intermixed. Before the eyes and on the lower jaw, the hair is short and sleek; on the forehead and posterior part of the cheeks considerably longer; and on the occiput and neck it is as high as the ears, and is intermixed with a soft wool or down. There is so much wool on the body that it gives the fur the character of that of the Polar hare. The ears are rounded and covered with shorter hairs than the neighbouring parts: the shortest hair is on their edges, and terminates so evenly with that on the back and front of the ear, as to give the appearance of having been trimmed with a pair of scissors and make the ear look thicker than it is. The long fur on the back part of the cheeks is directed backwards and contributes to give a peculiar cast to the physiognomy and an apparent great thickness to the neck. The vibrissæ about the mouth are very strong, and in some specimens nearly white, in others dusky-brown. The hair on the body, particularly on the sides, is long: it is rather longer on the belly than on the back, but not so close and woolly, and denser and coarser on the tail than elsewhere. Fur on shoulders and thighs long; but the foreparts of the legs are covered with short hair, and that on the hind-legs is shortest and smoothest; on the hinder surface of the legs the hair is longer, and the soles of the feet are clothed with dense dirty-white woolly hair like those of the hare, whence the Linnæan name. Claws long, compressed, slightly arched, and of a light horn-colour. (Dr. Richardson.)

Summer Dress.—The long white hair which formed the winter clothing falls off in April or May, when the snow begins to disappear, and is replaced by shorter hair which is more or less coloured.

Head and chin brown, having some fine white hairs scattered through the fur; ears, externally, coloured like the head; within white: a similar brown colour extends along the back to the tail, and from the back is continued down the outside of all the legs, but, on the latter, a few white hairs are intermixed; the whole under parts and the insides of the legs are dingy-white; the tail is brownish above, becoming whiter at the end, and is entirely white beneath. (Joseph Sabine, from a specimen killed at York factory on Hudson's Bay in August.) 'On the approach of winter,' says Dr. Richardson, 'the fur lengthens, the white hairs increase in number, all the hairs become white at the tips, but retain more or less of the bluish or brownish-gray colour at the roots, until the fur is in *prime* winter order, when it is of its full length, and almost everywhere of a pure white colour from the roots to the tips. The fur on the soles of the feet becomes thinner and shorter in the summer time, and several naked callous places then appear, but they are not so large as those which exist on the soles of the feet of the other North American foxes at the same season of the year.'

Food.—Eggs, young birds, blubber, and carrion of any kind; but their principal food seems to be lemmings of different species. (Richardson.)

Habits.—Extremely cleanly. It never soils its habitation, nor has it any unpleasant smell. Breeds on the sea-coast, chiefly within the Arctic Circle. Is very unsuspicious and easily taken by traps, even, as it is stated, when baited in its presence. Captain Lyon, R.N., received fifteen from one trap in four hours. Is gregarious, forming burrows in sandy spots, twenty or thirty together. Dr. Richardson saw one of these fox villages on Point Turnagain, in lat. 68½°. Soon becomes tame in confinement and is eager to hide its food as soon as it obtains it, even when there seems no danger of losing it. Snow is the material generally used for this purpose, and when piled over the food is forcibly pressed down by the nose. 'I frequently observed my dog-fox,' writes Captain Lyon, 'when no snow was attainable, gather his chain into his mouth, and in that manner carefully coil it so as to hide the meat. On moving away, satis-

* With regard to its inhabiting America, see the concluding paragraph of the section relating to American Foxes.

fied with his operation, he, of course, had drawn it after him again, and sometimes with great patience repeated his labours five or six times, until in a passion, he has been constrained to eat his food without its having been rendered luscious by previous concealment. Snow is the substitute for water to these creatures, and on a large lump being given to them, they break it in pieces with their feet, and roll on it with great delight. When the snow was slightly scattered on the decks, they did not lick it up, as dogs are accustomed to do, but by repeatedly pressing with their nose, collected small lumps at its extremity, and then drew them into the mouth with the assistance of the tongue.' The same author gives the following account of the sagacity of the same dog-fox:—'He was small and not perfectly white; but his tameness was so remarkable, that I could not afford to kill him, but confined him on deck in a small hutch with a scope of chain. During the first day, finding himself much tormented by being drawn out repeatedly by his chain, he at length, whenever he retreated to his hut, took this carefully up in his mouth, and drew it so completely after him, that no one who valued his fingers would endeavour to take hold of the end attached to the staple.'

Captain James Ross, in his Appendix to Captain Sir John Ross's last voyage, gives the following account of the *Arctic Fox*:—'It brings forth from six to eight young early in June. In July, 1831, one of their burrows was discovered on the sandy margin of a lake; it had several passages, each opening into a common cell, beyond which was an inner cell, where the young, six in number, were taken. They were precisely of the same colour as the old ones at that season of the year. Hearne says that the young are all over of a sooty black. This probably refers to the following variety of the Arctic Fox (*Canis Lagopus*, var. *fuliginosus*). In the outer cell, and in the several passages leading to it, we found great numbers of the two species of lemming, several ermine, and the bones of hares, fish, and ducks in great quantities. Four of the young foxes were kept alive till the end of the following winter, and were a great amusement to our crew by their playfulness, as they soon became very tame. They never attained the pure white of the old fox, a dusky lead-colour remaining about the face and sides of the body. There is a remarkable difference in the disposition of these animals, some being easily tamed, whilst others remain savage and untractable, notwithstanding the kindest treatment. The females are much more vicious than the males. A dog-fox that lived several months became so tame in a short time that he regularly attended our dinner-table like a dog, and was always allowed to go at large about the cabin. A pair, kept for the purpose of watching the changes of their fur, threw off their winter dress during the first week in June; the female a few days earlier than the male. Towards the end of September the brown fur of summer gradually became of an ash-colour, and by the middle of October was perfectly white: from that period it continued rapidly to increase in thickness until the end of November, when the last of the two died, having lived in confinement nearly ten months.'

Geographical Distribution.—'The highest northern latitudes throughout the winter. The young generally migrate to the southward late in the autumn and collect in vast multitudes on the shores of Hudson's Bay: they return early the following spring along the sea-coast to the northward, and seldom again leave the spot they select as a breeding-place.' (Captain James Ross.) 'Their southern limit in North America appears to be about lat. 50°. They are numerous on the shores of Hudson's Bay, north of Churchill, and are found at Behring's Straits; but the brown variety (*fuliginosus*) is the more common in the latter quarter.' (Dr. Richardson.) The Doctor continues thus:—'Towards the middle of winter they retire to the southward, evidently in search of food, keeping as much as possible on the coast, and going much further to the southward in districts where the coast-line is in the direction of their march. Captain Parry relates that the Arctic foxes, which were previously numerous, began to retire from Melville Peninsula in November, and that by January few remained. Towards the centre of the continent, in lat. 65°, they are seen only in winter, and then not in numbers; they are very scarce in lat. 61°, and at Carlton House, in lat. 53°, only two were seen in forty years. On the coast of Hudson's Bay however, according to Hearne, they arrive at Churchill, in lat. 59°, about the middle of October, and afterwards receive reinforcements from the northward until their numbers almost exceed credibility. Many are captured there by the hunters, and the greater part of the survivors cross the Churchill River as soon as it is frozen over, and continue their journey along the coast to Nelson and Severn Rivers. In like manner they extend their migrations along the whole Labrador coast to the Gulf of St. Lawrence.'

Utility to Man.—The fur is considered to be of small value in commerce, but the flesh is said to be good food, particularly when young. Captain Franklin and his party compared the flavour of the young animal to that of the American hare. Captain Lyon thought it resembled the flesh of a kid. Captain Sir John Ross's party (last voyage) named them 'lambs,' from their resemblance in flavour to very young lamb. 'The flesh,' continues Captain James Ross, 'of the old fox is by no means so palatable; and the water it is boiled in becomes so acrid as to excoriate the mouth and tongue. During our late expedition they constituted one of the principal luxuries of our table, and were always reserved for holidays and great occasions. We ate them boiled, or more frequently, after being parboiled, roasted in a pitch-kettle. They were taken by us in considerable numbers, and formed a valuable addition to our provisions when meat was very scarce.'



Arctic Fox (Vulpes lagopus) in its winter dress.

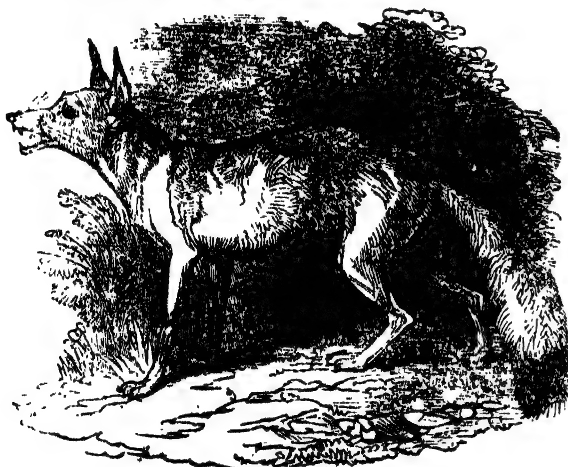
Zoologists generally agree that the *Sooty Fox*, or *Blue Fox* (*Canis fuliginosus*), is only a variety of the animal above described and figured.

Dr. Richardson observes that M. F. Cuvier and M. Desmarest, who admit and describe the American red fox (*V. fulvus*) as a distinct species, state the *Common Fox* of Europe to be also an inhabitant of North America. Dr. Richardson remarks that it does not exist in the countries north of Canada lying to the eastward of the Rocky Mountains, and consequently did not come under his notice on the expeditions to which he was attached; but he admits it into 'Fauna Boreali Americana,' as being most probably an inhabitant of New Caledonia; and Kalm remarks that he had two different accounts of their coming over. Mr. Bartram, and several others, were told by the Indians that these foxes came into America soon after the arrival of the Europeans, after an extraordinary cold winter, when all the sea to the northward was frozen. But Mr. Evans, and some other persons, assured Kalm that it was still known by the people that a gentleman of fortune in New England who had much inclination for the chase, brought over a great number of foxes from Europe, and let them loose in his territories that he might indulge his passion for hunting, at the very beginning of New England's being peopled with European inhabitants. These foxes were believed to have so multiplied that all the red foxes in the country were their offspring. Kalm, who states that these foxes were very scarce at New York, but that they were entirely the same with the European sort, considers neither of those accounts satisfactory. Dr. Godman remarks that these reddish foxes were numerous in the middle and southern States of the Union, and were every where notorious depredators of poultry-yards. Dr. Richardson thinks it very probable

that an investigation into the characters of the American foxes will show that the reddish fox of the Atlantic States is a variety of the *Canis cinereus*, which has been mistaken for the European fox.

African Foxes.

The species are numerous, but our limits not permitting us to enter at large into a history of them, we select as an example the Caama, *Canis* (*Vulpes*) *Caama*, the smallest of the South African foxes. Dr. Smith, in his Catalogue to the South African Museum, from a specimen in which our figure is taken, observes, that some few individuals are to be met with within the limits of the colony, but that the favourite residence of the species seems to be to the northward; though there it is daily becoming less and less numerous, owing to the skins being much in request among the natives as a covering in the cold season. Many of the Bechuanas, it is stated, find their sole employment in hunting these animals with dogs or snaring them. Like other foxes, it is a great enemy to birds which lay their eggs on the ground; and it is suspiciously watched by the ostrich in particular during the laying season. The Caama, when he succeeds in obtaining the eggs, pushes them forcibly along the ground till they come in contact with some substance hard enough to break them, when he feasts on the contents. The natives take advantage of the watching of the ostrich for this robber to lure the bird to its destruction. Knowing that the anxious parent runs to the nest the moment a fox appears, they fasten a dog near it and hide themselves. The ostrich approaches to drive away the supposed fox, and is shot by the concealed hunter. (*Catalogue of the South African Museum.*)



Canis Caama.

Asiatic Foxes.

As examples of the Asiatic foxes we select the small Indian insectivorous fox (*Canis Bengalensis* of Shaw), which Mr. Hodgson notes among the *mammalia* of Nepâl, as occurring in the Tarâi. It is brown above, with a longitudinal black band. The space round the eyes is white, and the tail is terminated with black.

The *Fox* of the Dukhun (Deccan), *Kokree* of the Mahrattas, *Canis Kokree* of Sykes, which the Colonel considers to be new to science, although it much resembles the descriptions of the *Corsac*, is described by him (*Zool. Proc.*, 1831) as a very pretty animal, but much smaller than the *European Fox*. Head short; muzzle very sharp. Eyes oblique; *irides* nut-brown. Legs very slender. Tail trailing on the ground; very bushy. Along the back and on the forehead fawn colour, with hair having a white ring near to its tip. Back, neck, between the eyes, along the sides, and half way down the tail, reddish-grey, each hair being banded with black and reddish-white. All the legs reddish outside, reddish-white inside. Chin and throat dirty-white. Along the belly reddish-white. Ears externally dark-brown, and with the fur so short as to be scarcely discoverable. Edges of the eyelids black. Muzzle red-brown. Length 22 and 22½ inches; of the tail 11½ to 12 inches (Sykes).

The *Canis Himalaicus*, *Hill Fox* of the Europeans in the Doon, in Kumaon, and the more western and elevated parts of the mountains, described by Mr. Ogilby in the zoological part of Mr. Royle's 'Flora Himalaica,' is greatly admired for the beauty of its form and the brilliancy and variety of its colours. The whole length to the origin of the tail is 2 feet 6 inches; that of the tail 1 foot 6 inches; that of the ears 4 inches; and the height is stated at about 1 foot 4 or 5 inches. The animal agrees with the common European and American foxes (*C. vulpes* and *C. fulvus*) in the black marks on the backs of the ears, and in front of the hind and fore-legs. The coat consists of long, close, rich fur, as fine as that of any of the American varieties, and of infinitely more brilliant and varied colours. Mr. Royle procured one at Mussooree in its winter dress. Mr. Hodgson notes it as a large *Fox* N. S. ? peculiar to the Kachâr. For details we refer the reader to the interesting work above mentioned, and the *Zool. Proc.* for 1836, p. 103.

Fennec.

This animal, which has given rise to much controversy, is generally placed by the French zoologists among the *Foxes*: but the observations of Mr. Yarrell, to which we shall presently allude, lead him to pronounce decidedly that the Fennec appears to him to belong to the genus *Canis* properly so called; the osteological part of the structure closely resembling that of the dog, and the pupil of the eye being circular. We owe to Colonel Dixon Denham the first good figure of the animal, and in the Appendix to his travels is a very luminous history and description of it, as far as the information went at the time of its publication.

The *Fennec* obtained by Bruce when he was consul-general at Algiers, was said to be more frequently found in the territories of Benni Mezzab and Werglah, where the date grows. In these districts the Fennecs are hunted for their skins, for which there is a market at Mecca, whence they are exported to India. Bruce, after leaving Algiers, bought two more Fennecs, one at Tunis, which had been brought by the Fezzan caravan to the Island of Gerba, and thence to the place where Bruce procured it; the other at Senaar, and he knew not whence this last came. Both these resembled the first, and were called Fennecs. The Fennec which Bruce had at Algiers lived for several months, and when he left that place he gave the animal to Captain Cleveland, R.N., who presented it to Mr. Brander, the Swedish consul. His favourite food consisted of dates or any sweet fruit; but he was also very fond of eggs. He would eat bread when hungry, more especially if it was rendered palatable by honey or sugar. The sight of a bird aroused him to eager watchfulness as long as it was present; and a cat was his aversion. He would endeavour to hide from the latter; but never showed a disposition to resist or defend himself. The animal was disposed to sleep by day, but as night came on it became restless to excess. Bruce never heard it utter any sound. He says that the animal is described in many Arabian books under the name of *El Fennec*, by which appellation he states that it is known all over Africa; and he conceives that the word is derived from the Greek φοινιξ, a palm or date-tree, adding that the animal builds his nest on trees, and does not burrow in the earth.

Description of Bruce's Fennec.—Length about 10 inches; tail 5½ inches, near an inch at the tip being black. From the point of the fore-shoulder to that of the fore-toe 2⅞ inches; from the occiput to the point of nose 2½ inches. Ears erect, 3⅜ inches in length, 1½ inch in breadth, with a plait or fold at the bottom externally; the interior borders were thickly covered with soft white hair, but the middle part was bare, and of a pink or rose-colour; interior cavity very large. Pupil of the eye large and black; iris deep blue. Whiskers strong and thick. Nose sharp at the tip, black and polished. Upper jaw projecting: number of cutting teeth in each jaw six; those in the under jaw smallest; two long, large, and exceedingly pointed canines in each jaw; molars four on each side above and below. Legs small; feet very broad, with four toes, armed with crooked, black, and sharp claws on each; claws of fore-feet more crooked and sharp than those behind. Colour of the body dirty-white, bordering on cream-colour; the hair on the belly rather whiter, softer, and longer than that of the rest of the body: look, sly, and wily.

Lacépède is said to have given the animal the generic name of *Fennecus*. Illiger describes it under the appellation of *Megalotis*, placing it in his order Falculata, immediately before Canis and Hyæna, and gives the number of molars in each jaw as six, but without quoting any authority.

Sparman makes the Fennec the species he has called Zerda, and a little animal found in the sands of Cambeda, near the Cape of Good Hope· after him, Pennant and Gmelin named the animal *Canis Cerdo.* Brander considered it as a kind of fox, but Blumenbach inclined to place it among the Viverræ. Geoffroy St. Hilaire, holding Bruce's description to be inaccurate and imperfect, supposes the Fennec to be a Galago; but Desmarest, like Illiger, gives it a position at the end of the *Digitigrades* in the order *Carnassiers.* Cuvier, in his 'Règne Animal,' speaks of the animal doubtingly and loosely.

Mr. Griffith figures two animals, both, according to him, belonging to this genus. One came from the Cape of Good Hope, and is in the Paris Museum, where Cuvier named it *Canis Megalotis;* and Desmarest has described it in his Mammalogie. (*Ency. Meth. Supp.*, p. 538.) This is called by Col. Hamilton Smith, who made the drawings of both, Megalotis Lalandii, to distinguish it from Bruce's Fennec. The other is from the interior of Nubia, and is in the Frankfort Museum. The first of these is as large as the common fox, and differs altogether from Bruce's Fennec. Col. Smith considers the second to be Bruce's animal.

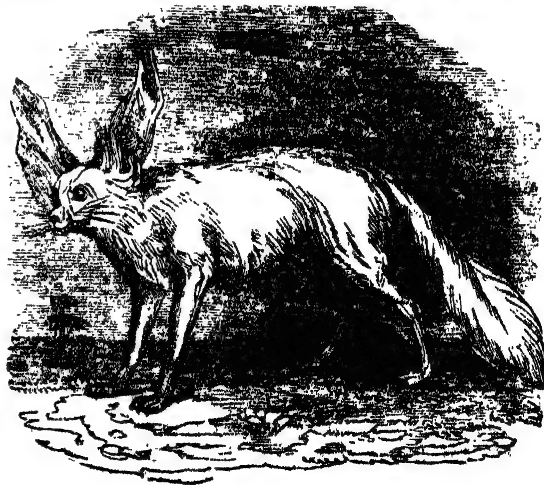
M. Leuckart states (Isis 2, Cahier, 1825) that M. Temminck and himself saw the Frankfort animal which had been drawn by Col. Smith, and recognised it as the true Zerda; and M. Temminck, in the prospectus of his 'Monographies de Mammalogie,' announced it as belonging to the genus *Canis.* M. Leuckart agrees with him, and would suppress the generic terms *Megalotis* and *Fennecus,* because, in his opinion, the animal very obviously belongs to the genus Canis, and to the subgenus Vulpes, the number of teeth and their form being precisely the same as those of the fox, to which it bears a great resemblance in the feet, number of the toes, and form of the tail, and the principal difference lying in the great length of the ears and the general smallness of the animal.

Description of Major Denham's Fennec (Fennecus Cerdo). Dental formula:—Incisors $\frac{6}{6}$; Canines $\frac{1}{1}$; Molars $\frac{6}{7}\frac{6}{7}$. Length of head from extremity of nose to occiput (inches) $3\frac{3}{8}$; breadth between eyes $0\frac{7}{8}$; length of ears $3\frac{1}{8}$; widest breadth 2; breadth of cranium between the ears $1\frac{3}{8}$; length from occiput to insertion of tail $9\frac{1}{4}$; tail 6; height before, from the ground to the top of back, above shoulder, $6\frac{3}{8}$; height behind to top of back, above loins, $7\frac{1}{2}$; breadth of extremity of nose $0\frac{3}{16}$; length of middle claws of fore-feet $0\frac{7}{16}$; external claws $0\frac{1}{3}$; middle and external claws of hind-feet $0\frac{1}{4}$. General colour white, slightly inclining to straw-yellow; above from the occiput to insertion of tail light rufous-brown, delicately pencilled with fine black lines from thinly scattered hairs tipped with black; the exterior of the thighs lighter rufous-brown; chin, throat, belly, and interior of thighs and legs, white or cream-colour. Nose pointed and black at the extremity, covered above with very short whitish hair inclining to rufous, with a small irregular rufous spot on each side beneath the eyes; whiskers black, rather short, and scanty; back of head pale rufous-brown. Ears very large, erect, and pointed, covered externally with short, pale, rufous-brown hair; internally thickly fringed on the margins with long, greyish-white hairs, especially in front; the rest of the ears internally, bare; externally, folded or plaited at the base. Tail very full, cylindrical, rufous-brown, pencilled with fine black lines on the back, deeper above than underneath, and with a small dark brown spot at an inch below its insertion on the upper side; ends of the hairs at the extremity of the tail black, forming a black tip about three quarters of an inch long. Anterior feet pentadactylous, posterior tetradactylous; both covered to the claws with moderately long whitish hairs, slightly inclining to straw-yellow; claws moderately hooked, very much compressed, and very sharp, yellowish-white or light horn-colour; hinder claws most compressed, longest, and least arched. The fur very soft and fine; that on the back from the forehead to the insertion of the tail, as well as that on the upper part of the shoulder before, and nearly the whole of the hinder thigh, formed of tri-coloured hairs, the base of which is of a dark lead-colour, the middle white, and the extremity light rufous-brown. (*Appendix to Major Dixon Denham's and Captain Clapperton's, R. N., Travels and Discoveries in Northern and Central Africa,*' 4to., London. John Murray, 1826.)

After the appearance of the account in the appendix to Col. Denham's Travels which had been drawn up by Mr. Children and Mr. Vigors conjointly, Mr. Cross, then of Exeter Change, presented a fine young specimen immediately after its death to the Zoological Society, by which means a complete skeleton, as well as a preserved skin, was set up. Mr. Yarrell, to whom the skull was submitted for inspection, found that the teeth agreed in every particular with the dentition of the genus *Canis,* in which it was originally placed by Bruce. The frontal sinus was somewhat less than the general proportion observed in this family, and the top of the head had no appearance of the central ridge for the insertion of the upper edge of the temporal muscle so conspicuous in the *Canes Lupus* and *Lycaon, Vulpes,* and *Lagopus.* There was a greater development of the lateral portions of the parietal bones by which it obtains a larger volume of brain; the zygomatic arch was more compressed, and the post orbital portion of the bones forming the arch was much weaker. The head, compared with those of the most perfect English breed of dogs, more closely resembled that of the *terrier* (Canis Britannicus of authors, Canis terrarius of Dr. Caius) than any other, but the muzzle in the *Fennec* was more pointed. The form of the lower jaw and its condyles also agreed precisely with the same parts in the dog. The head of the *Fennec* however presented another peculiarity—the auditory cells were larger than the same parts in the *common fox,* though the *Fennec* is two-thirds less than the *fox* in size. The *ossicula auditûs* were as large in proportion, and equally perfect in form. The external conch was also large, and it is probable that the *Fennec* hears more acutely than most quadrupeds. The skeleton, generally, so closely resembled that of the dog as to make a particular description unnecessary: there was also one other point of similarity—the pupil of the eye was circular.

Mr. Vigors ascertained from the same skull that the teeth of the *Fennec* correspond almost precisely with those of the *fox.*

M. Rüppel has figured and described in his *Atlas Zu der Reise im nördlichen Afrika,* together with six other species of *Canis,* the *Fennec,* Canis Zerda, Zimm. Three specimens were transmitted to Frankfort, all perfectly alike in markings, and differing little from each other in size. They were found in the neighbourhood of Amlenkal, and in the desert of Korti, where they inhabit holes made by themselves. They do not nestle on trees as Bruce asserted.



Fennec

FOSSIL FOXES.

Dr. Buckland, in his 'Bridgewater Treatise,' figures a *fox* as recent and fossil among the mammalia of the first period of the Tertiary series (Eocene of Lyell), and mentions the *fox* in his list of vertebral animals found in the gypsum of the Basin of Paris. The most complete fossil specimen is that which was found in the quarries of Œningen, near Constance, overlaid by upwards of twenty feet of marl, limestone, and building stone, brought to England by R. I. Murchison, Esq., then president of the Geological Society of London, who describes the deposit in the 'Geological

Transactions' (vol. iii., 2nd Series), and gives excellent figures of the *fox*, which is accurately described in the same paper by Dr. Mantell. Mr. Murchison's observations lead him to think that the Œningen formation is exclusively of antient lacustrine origin, but that it is entirely posterior to the molasse of Switzerland. Birds, reptiles, fishes, insects, crustaceans, conchifers, mollusks, and plants, a leaf of one of the latter being scarcely distinguishable from the *Acer villosum* of Nepâl, occur in the Œningen beds. The other mammalia found there were Rodents, see Cuv., *Ossem. Foss.*, tome v., partie i., p. 61-64); one is in the British Museum, and has been subsequently figured and named by Mr. König, *Anœma Œningensis*, and Professor Sedgwick brought one from the quarries which M. Laurillard referred to the genus *Lagomys*. It is worthy of notice that lemmings are said to be the principal food of the *Arctic fox*, and that Captain James Ross found in the burrow of one great numbers of the two species of lemming, and the bones of hares, fish, and ducks, in great quantities as well as several ermine, (p. 392). Mr. Murchison's *fox* is stated to be scarcely distinguishable from the *common* fox. One slab of this fine fossil is in Mr. Murchison's possession: the other half he most liberally presented to the Geological Society of London, in whose museum it now is*.

FOX, RICHARD, bishop of Winchester, an eminent statesman, and minister of Henry VII. and VIII., was born of poor parents, towards the middle of the fifteenth century, at Ropesley, near Grantham, in Lincolnshire, studied at Magdalen College, Oxford, and Pembroke College, Cambridge, and finally went to the University of Paris for his further improvement in divinity and the canon law. There he laid the foundation of his fortunes, by gaining the friendship of Morton, bishop of Ely, a zealous Lancastrian, who had fled from England in 1483 upon the failure of the duke of Buckingham's insurrection against Richard III. Through Morton's introduction, Fox was taken into the earl of Richmond's service; and having been of material use in the negotiations with the French court preparatory to the descent upon England, continued to enjoy the earl's confidence after his accession to the throne by the title of Henry VII. He was successively made privy councillor, bishop of Exeter, keeper of the privy seal, secretary of state, bishop of Bath and Wells, Durham, and Winchester, and was frequently employed in important embassies. Indeed no one stood higher in favour, or had more weight with the king, who appointed him one of the executors of his will, and recommended him strongly to the notice and confidence of Henry VIII. He was also executor to Margaret countess of Richmond [BEAUFORT], and in that capacity had a great share in settling the foundation of St. John's College, Cambridge. Henry VIII. no doubt appreciated his talents and integrity, for he continued him in his offices; but the habits of the aged minister, trained to frugality under a most parsimonious master, were ill suited to retain the favour of a young, gay, ostentatious monarch, and he was thrown into the background by the earl of Surrey, lord treasurer. In hope of supplanting that nobleman by one qualified to win Henry's regard as a companion, yet too humble to aspire to the first place in the state, Fox introduced Wolsey, then his chaplain, to the king's society, in 1513. The result is well known. Wolsey soon engrossed the king's confidence; and in 1515 the bishop of Winchester, disappointed and disgusted, retired to his diocese, and spent the rest of his life in works of munificence and piety, and the discharge of the duties of his office. Corpus College, Oxford, and the free-schools of Grantham and Taunton, in Somersetshire, are of his foundation. He became blind about ten years before his death, which took place Sept. 14, 1528. He was buried in a chapel of his own building, on the south side of the high altar of Winchester cathedral. (*Biographia Britannica.*)

FOX, JOHN, commonly called the Martyrologist, from the work by which he is principally known, was born at Boston, in Lincolnshire, in 1517, was entered at Brazenose College, Oxford, in 1531, and elected a fellow of Magdalen College in 1543. Before this he had been chiefly distinguished for the cultivation of Latin poetry; but he had lately applied himself with great earnestness to the study of divinity, the result of which was that he became a convert to Protestantism, and on a charge of heresy being brought against him, was deprived of his fellowship in 1545. His father had left him some property, but this was also now withheld from him, on the same ground, by a second husband whom his mother had married, and he was in consequence reduced to great distress. At last he obtained the situation of tutor in the family of Sir Thomas Lucy, of Charlecot, in Warwickshire, the same whose deer-park Shakspeare is accused of robbing. This place however he left after some time, and was again subjected to many disappointments and hardships. At length he was taken into the house of Mary duchess of Richmond, to instruct the children of her brother the earl of Surrey, who was then confined on the charges for which he soon after suffered death. After the accession of Edward VI. Fox was restored to his fellowship; but he fell again into danger in the time of Mary, in consequence of which he went abroad, and after wandering through different parts of Germany was taken into employment as a corrector of the press by Oporinus, the eminent printer at Basil. On the death of Mary he returned to England, where his former pupil, the eldest son of the unfortunate earl of Surrey, who was now duke of Norfolk, received him with great kindness, and settled a pension on him for life. A prebend in the church of Canterbury was also given to him by Cecil. Although however he retained this preferment till his death, Fox never would subscribe to the articles of religion as finally settled, and this prevented his ever attaining any higher dignity in the church. He may be considered as having belonged properly to the sect of the Puritans. 'Fox the Martyrologist,' says the Rev. Michael Tyson, in a letter to Mr. Gough, dated Old House, 4th of August, 1779, and printed in Nichols's 'Literary Anecdotes of the Eighteenth Century' (viii. 649), 'is the first man I have seen depicted with a broad-brimmed hat and band; (see the print of him in the 'Herwologia,' p. 209).'

Fox died in 1587. He was the author of numerous works, a list of which is given in the 'Biographia Britannica';' but the only one that is now remembered is his 'History of the Acts and Monuments of the Church' (commonly called his 'Book of Martyrs'), which was first printed in one volume folio, in 1553, but was afterwards divided into three volumes, and has been repeatedly reprinted both entire, and in an abridged, modernized, or otherwise mutilated form. The trustworthiness of this great record of the sufferings of the early English reformers has been bitterly assailed by many Catholic writers; but nothing beyond a few comparatively unimportant mistakes, arising from some degree of credulity, and a natural, though exaggerated zeal, seems to be established against it; the veracity and honesty of the venerable author may be affirmed to be quite unimpeached. It has preserved many facts, some of greater, some of less importance, that are nowhere else to be found. It ought also to be noted to the credit of the author, that he showed himself throughout his life, if not a friend to toleration in the largest view, yet a decided enemy to persecution and severity in the suppression of religious errors. In this sentiment he was a considerable way ahead of the general, it may almost be said, the universally prevalent notions of his age. His mind was certainly not a very capacious one, nor had he any pretensions to great depth or accuracy of learning; but for the consistency and excellence of his moral character no man of his time was held in higher regard. Fox was a frequent preacher, as well as a voluminous writer. One of his early performances in Latin poetry, a comedy (as it is called) entitled 'De Christo Triumphante,' has been translated into English by Richard Daye, a son of John Daye, the printer, from whose press the first edition of the 'Acts and Monuments' proceeded, and who indeed would seem to have suggested that work. Daye's epitaph on his tombstone in the chancel of the church of Little Bradley-juxta-Thurlow, Suffolk, says that he—

> 'Set a Fox to write how martyrs run
> By death to life. Fox ventured pains and health
> To give them light; Daye spent in print his wealth.'
> (See Nichols, viii. 520; also 673.)

There is also a French translation of the abovementioned comedy under the title of 'Le Triomphe de J. C.,' by Jacques Bienvenu, citizen of Geneva, 4to., Genev., 1562; a very scarce work.

In a letter of Dr. Samuel Knight (author of the 'Life of Erasmus') to Dr. Z. Grey, dated Bluntsham, near St. Ives

* N. B. The reader is requested to take notice that in the article FELIDÆ the descriptions of the cuts of the Lion's claw are misplaced (p. 218). The words, 'Fore foot' ought to have been placed under the upper figure, and 'Hind foot' beneath the lower figure. In the fifth line from the bottom of the same article the word 'in' is printed for 'see.'

24th of March, 1734, published by Nichols (v. 360), the writer says, 'I made a visit to old father Strype, when in town last; he is turned ninety, yet very brisk, and with only a decay of sight and memory. . . . Mr. Strype told me that he had great materials towards the life of the old lord Burleigh, and Mr. Fox the Martyrologist, which he wished he could have finished, but most of his papers are in characters; his grandson is learning to decypher them.'

FOX, GEORGE, founder of the sect of Quakers, an enthusiast honest, zealous, illiterate, yet of no mean capacity and influence, was born at Drayton, in Leicestershire, in July, 1624. His origin and the beginning of his preaching are thus shortly told by Neal. (*Hist. of Puritans*, iv. c. 1.) 'His father, being a poor weaver, put him apprentice to a country shoe-maker; but having a peculiar turn of mind for religion, he went away from his master, and wandered up and down the countries like an hermit, in a leathern doublet: at length, his friends, hearing he was at London, persuaded him to return home, and settle in some regular course of employment; but after he had been some months in the country, he went from his friends a second time in the year 1646, and threw off all further attendance on the public service in the churches. The reasons he gave for his conduct were, because it was revealed to him that a learned education at the university was no qualification for a minister, but that all depended on the anointing of the spirit; and that God who made the world did not dwell in temples made with hands. In 1647 he travelled into Derbyshire and Nottinghamshire, walking through divers towns and villages, which way soever his mind turned, in a solitary manner. He fasted much, and walked often abroad in retired places, with no other companion but his Bible. He would sometimes sit in a hollow tree all day, and frequently walk about the fields in the night like a man possessed with deep melancholy. Towards the latter end of this year he began first to set up as a teacher of others, the principal argument of his discourse being, that people should receive the inward divine teachings of the Lord, and take that for their rule.'

From the beginning of his teaching he discontinued the use of outward marks of respect. He says, in his journal for 1648, 'When the Lord sent me forth into the world, he forbid me to put off my hat to any, high or low, and I was required to thee and thou all men and women, without any respect to rich or poor, great or small; and as I travelled up and down, I was not to bid people good-morrow or good-evening, neither might I bow or scrape with my leg to any one; and this made the sects and professions to rage.' Nothing probably conduced so much to the virulent persecution of the Quakers as their refusal of such tokens of respect, which persons in office interpreted into wilful contempt, except their conscientious refusal to take any oath, which involved them in the heavy penalties attached to the refusal of the oaths of allegiance and supremacy.

We shall not enter on a detail of his religious tenets, labours, or sufferings; the latter are fully recorded in his journal, and noticed in most histories. It is necessary however to refer to his doctrine (*Journal*, 1649, p. 26), that 'it is not the scriptures, but the holy spirit, by which opinions and religions are to be tried.' By this test, each convert might believe himself possessed of a peculiar infallible internal guide; and, in fact, it proved a warrant for any wild fancies which entered the minds of his followers, and led some into extravagances which gave a colour for the cruel treatment which all experienced. (Neal, iv. c. 3.) Into such extravagances Fox himself does not appear to have been betrayed. From 1648 till within a few years of his death his life was made up of travel, disputation, and imprisonment. He visited the continent of Europe several times, and in 1671 made a voyage to our American colonies. Wherever he went he seems to have left permanent traces of his preaching and presence. Quaker meeting-houses were first established in Lancashire and the parts adjacent in 1652, and in 1667 the congregations were organized into one body for purposes of correspondence, charity, and the maintenance of uniform discipline. The term Quaker arose at Derby in 1650, on occasion of Fox being brought before one Justice Bennet, 'who was the first that called us Quakers, because I bid them *Tremble at the Word of the Lord*.' In 1677, and again in 1681, he visited the Netherlands, where his tenets had taken deep root. After his return from the latter journey, his constitution being broken by the labours and hardships of near 40 years, he desisted from travelling, but continued to preach occasionally in London till within a few days of his death, which took place January 13, 1691.

To Fox, and others among his associates [BARCLAY; PENN], the praise of zeal, patience, self-denial, courage, are amply due; and their sufferings under colour of law are a disgraceful evidence of the tyranny of the government and the intolerance of the people. But there was one point in Fox's early conduct which justly exposed him to censure and punishment, his frequent interruption of divine worship as performed by others. From this practice, in the latter part of his ministry, he seems to have abstained. His moral excellence and the genuineness of his devotion are unquestioned. Penn, a favourable witness, but a grave, sober, learned man, not likely to be caught by mere ranting, has left an elaborate tribute to Fox's virtues in the preface to Fox's Journal, from which we extract the following detached passages.

'He had an extraordinary gift in opening the scriptures, but above all he excelled in prayer. The inwardness and weight of his speech, the reverence and solemnity of his address and behaviour, and the trueness and fullness of his words, have often struck even strangers with admiration. The most awful living reverent frame I ever felt or beheld, I must say was his in prayer. ** He was of an innocent life, no busy-body, nor self-seeker ** a most merciful man, as ready to forgive as unapt to give or take an offence** an incessant labourer; as unwearied, so undaunted in his services for God and his people; he was no more to be moved to fear than to wrath ** civil beyond all forms of breeding, very temperate, eating little and sleeping less, though a bulky person.' Fox's writings were for the most part short, they are very numerous, and in the collective edition fill three volumes, folio. (Fox's *Journal; Neal's History of Puritans;* Sewell's *History of Quakers*. Aikins's *Gen. Biog.* contains a better account of Fox than any other dictionary that we have seen.)

FOX, CHARLES JAMES, was born on the 24th of January, 1749. He was the third son of the Right Hon. Henry Fox, who, in 1763, was created Lord Holland, and of Lady Georgiana Carolina, the eldest daughter of Charles, second duke of Richmond.

Having commenced his education in a preparatory school at Wandsworth, Fox was sent, at the age of nine, to Eton. Here his progress was very rapid; and while he thus early gave unequivocal indications of the powers of mind which afterwards yielded so rich and abundant a harvest, he was not less distinguished among his school companions for that warmth of feeling and amiability of character which, through life, served to make men his friends and keep them so. His education was interrupted, before he was fifteen, by a three months' trip to Paris and to Spa, in which he was accompanied by his father; and the interruption is of more consequence than otherwise it could have been, if it be true, as is represented, that to the misplaced indulgence of the father during this tour is to be traced the devotion to the gaming table, which, ever after, was the principal alloy of Fox's happiness. 'He had left school a boy,' says Mr. Allen, in his biographical sketch in the 'Encyclopædia Britannica;' 'he returned to it with all the follies and fopperies of a young man.' He continued at Eton but one year longer, and, in the autumn of 1764, entered at Hertford College, Oxford. Here, as during the latter part of his course at Eton, learning and pleasure were his pursuits in turn. He left Oxford in the autumn of 1766. He then went abroad, and having passed two years chiefly in Italy, returned to England in August, 1768. In his absence, and before he was yet of age, he had been elected member of parliament for Midhurst.

Fox took his seat in parliament as a supporter of the duke of Grafton's ministry. His father, who had entered public life under the auspices of Sir Robert Walpole, had in the progress of time become estranged from the Whig party; and it was from the opinions of the father at this period in favour of the court and of an administration whose strength was in the court, that the beginning of Fox's political career derived its character. Fox made his first speech on the 15th of April, 1769, on the subject of the famous Middlesex election, supporting the decision in favour of Colonel Luttrel and against Mr. Wilkes. In February, 1770, when the duke of Grafton was succeeded by Lord North as premier, Fox was appointed a junior lord

of the admiralty. He resigned this situation two years after, in consequence of some misunderstanding with Lord North; but in less than twelve months he was brought back into the ministry, being appointed, in January, 1773, one of the lords of the Treasury. In February of the next year he was again dismissed from his situation, and that somewhat unceremoniously. The immediate cause of the dismissal was the following. A motion had been made in the House of Commons that Mr. Woodfall, the printer of the 'Public Advertiser,' be taken into the custody of the serjeant-at-arms, in consequence of some remarks on the Speaker which had appeared in that newspaper; when Fox, thinking this punishment insufficient, without consulting Lord North moved an amendment to the effect that Mr. Woodfall be committed to Newgate. Lord North, being compelled, or thinking himself compelled, to support the amendment against the original motion, was left in a minority on a division. There had previously been some coolness between Fox and the premier. The defeat which Lord North considered had been brought upon him by an act of insolent temerity on the part of Fox did not of course tend to diminish it; and a few days after, as Fox was sitting in the House of Commons on the ministerial bench, he received from the hands of one of the door-keepers the following laconic note:—'Sir, His Majesty has thought proper to order a new commission of the Treasury to be made out, in which I do not perceive your name. North.' In a very short time Fox was in opposition.

So long as Fox was a ministerialist he had by no means concurred on all occasions in the opinions of his colleagues, nor, when he differed, had he abstained from expressing and acting upon his own. When he retired from office in 1772, one chief reason for the step was his opposition to the Royal Marriage Act, which was introduced that year by the ministry. Afterwards, in 1773, when he was again in office, he not only spoke, but voted against his colleagues, in favour of a motion by Sir William Meredith for a committee of the whole house to consider the propriety of subscription to the Thirty-nine Articles. He went even so far as to be one of the tellers for the minority on this occasion. And, in order to protect Fox from the suspicion of being actuated by vengeance or other discreditable motives in the course of opposition upon which he now entered, it must be added, that the question of American taxation, on which, and on the measures arising out of which, he violently opposed Lord North's administration, was never once brought under discussion during the time that he himself formed a part of it. Again, he had formed, since the time of his entrance into public life, an intimate friendship with Mr. Burke; and if the influence exercised over him by this distinguished statesman—an influence to whose strength Fox frequently testified in after days, when their paths were dissevered and a cloud had settled upon their friendship—contributed at all to bring about the change which now took place in Fox's political position, neither is this surely any ground for reproach. Mr. Burke's conversation, doubtless, as well as his speeches and writings, assisted to open Fox's eyes to the evils of that system of court intrigue and domination to which for a while, in a subordinate part, he had allowed himself to be subjected. From those evils again he had now smarted in his own person; and while it would have been strange if any longer he had been blind to them, it would have been a despicable thing if the fear of men's tongues, or the pride of an outward consistency, had prevented him from speaking and acting by the light of his newly-gotten wisdom. It should be borne in mind also that his father, who was mainly instrumental in connecting Fox with the ministry, died in the summer of 1774; and this event would most probably have removed many scruples that hitherto might have served to restrain Fox from entering the ranks of opposition.

On the 23rd of March, 1774, the House went into committee on Lord North's Boston Port Bill, the object of which was to deprive that harbour of its privileges in consequence of the opposition made by the inhabitants of Boston to the tea duty. This was the first occasion on which Fox opposed the minister. But from this time forward he was unremitting in his opposition. He took his stand first on the principle that the American colonies ought not to be taxed without being represented; and secondly, on the inexpediency of endeavouring to wring taxes from them by force and at the risk of rebellion. Thus condemning the war in which Lord North involved the nation as unjust and inexpedient, he also took many opportunities to censure strongly the manner in which it was carried on. He denounced the heavy expenditure which ministers, in prosecution of a war unjust, inexpedient, and little likely to be successful, were recklessly entailing upon the nation; and when he saw no prospect of their desisting from the war, he zealously sought, in conjunction with his party, to effect by other means a diminution of the public burdens. In the beginning of 1780 Mr. Burke brought forward his plan of economical reform, which was zealously supported by Fox. After having passed through its earlier stages, it was ultimately rejected. But the people had now come to feel the weight of their burdens and to speak out. Petitions poured in from all parts of the kingdom for a reduction of the public expenditure; and on the 6th of April resolutions were carried against the influence of the crown and in favour of an inquiry into the expenditure of the country and of a diminution thereof. A concurrence of favourable circumstances enabled the minister to stand up against this vote, and to recover his once lost majority. But even a dissolution of the parliament, which took place shortly after, enabled him to gain only a short respite. On the 22nd of February, 1782, a motion of General Conway's for an address to the crown against a continuance of the war was lost only by one vote; and when revived under a somewhat different form five days after, was carried by a majority of 19. On the 19th of March, the ministers having shown for a short time a disposition still to cling to office, resigned their situations.

It is needless to say how much Fox's exertions had contributed to this result. He had indeed risen by this time to be considered the leading member of opposition, and to be, more than any other statesman of the time, 'conspicuous in the nation's eye.' At the last general election, in the autumn of 1780, he had been solicited to stand for Westminster, and had been returned in the teeth of every court effort and every trick of private intrigue and intimidation. On the formation of the new ministry under Lord Rockingham, Fox was appointed secretrary of state for foreign affairs. He immediately set about negotiations for peace. For this purpose he instructed Mr. Grenville, the plenipotentiary at Paris, to propose in the outset the independence of the United States of America, not making it a condition of a general treaty. This he did in pursuance of a resolution which, upon his recommendation, had been passed in the cabinet, and to which the king's assent had been obtained. But the ministry had contained within itself from the beginning in the person of Lord Shelburne, who had been introduced by the king without consulting the wishes of Lord Rockingham, an element of dissension. This nobleman, between whom and Lord Rockingham's friends there was no cordial cooperation, and who was naturally led to presume much on his fancied possession of the royal confidence, was now doing his best to thwart Fox's measures of pacification. He sought to represent the offer of recognition of independence as a conditional one; and, after Lord Rockingham's illness had rendered him unable to attend the deliberations of the cabinet, he succeeded in getting a majority to concur in this view. He was afterwards discovered by Fox to be carrying on a clandestine communication with Dr. Franklin. Fox now made up his mind to resign. He did so at once upon the death of Lord Rockingham, which took place in July, but four months after the formation of the ministry; and the same course was then taken by other friends of Lord Rockingham, by Lord John Cavendish, the Duke of Portland, and Lord Keppel. The Rockingham ministry was now broken up.

The Shelburne ministry, though, as regards its mode of formation, it was but a modification of the old one, was yet essentially different in character. Mr. Pitt, who had entered parliament on the occasion of the general election in 1780, and who, during the short time that he had had a seat, had fought by the side of Fox against the American war and in favour of parliamentary reform, accepted the office of chancellor of the exchequer in the new ministry. Other vacant offices were filled up by old supporters of the war which Mr. Pitt had opposed, men who had held subordinate places in Lord North's administration. Lord North was himself excluded from the new arrangements. Hence it came to pass that Fox and Lord North, who for the last eight years had been violent antagonists, were found by one another's side in opposition; and that after a time, the great question of peace or war with America

which had formerly divided them having been settled, and each being assured that he could place reliance upon the good faith of the other, the similarity of their political positions brought about a coalition. That coalition called forth at the time, and has called forth since, much disapprobation. It may have been ill-judged; and the result indeed showed that the parties had not formed a correct estimate of the public opinion, which was an important element in the problem to be solved. But there was not a shade of dishonesty in the transaction. And inasmuch as it should be the object of every statesman to extract the greatest possible amount of good out of the political circumstances of the time, such a coalition would seem to be correct in principle, and to be approved, if only it be expedient and free from dishonour.

The question being now no longer whether there was to be peace or war with America, but in what way peace was to be brought about, the two parties in opposition united to pass a vote of censure on the terms of peace proposed by the ministers. This was in February, 1783. The ministers, unable to obtain the king's consent to a dissolution, resigned; and after some difficulties a ministry was formed on the 2nd of April, of which the Duke of Portland was premier, and Lord North and Fox secretaries of state. This again was a short-lived administration; and, like that of Lord Rockingham, it fell by the influence of court intrigue. The principal measure which it attempted was that known by the name of Fox's East India Bill, which went to vest the government of the East Indies in a board consisting of seven members, who were to be appointed, the first time by parliament, but always afterwards by the crown, for a period either of three or five years. The objections to the bill were principally of two kinds, 'violation of charter' (to adopt Mr. Fox's own mode of putting them) 'and increase of influence of the crown;' but there were others again who denounced it as tending to diminish the influence of the crown for the aggrandizement of the ministers, and who opposed it upon this ground. Such was the view adopted by George III. himself. Accordingly, when the bill had passed through the Commons, and came on for the second reading in the Lords, the king sent a message, through Lord Temple, to all noblemen to whom his personal influence extended, that he should consider those who voted for the bill not only not his friends, but his enemies. The ministers were consequently left in a minority. The next day they were dismissed; and the ministry which had been formed in April ended its career in December of the same year. A new ministry was formed almost immediately under Mr. Pitt.

The new ministers very soon found themselves in a minority in the House of Commons. Two resolutions, one for preventing the payment of any public money from the treasury, exchequer, or bank of England, in case of a prorogation or dissolution, unless the supplies should be previously appropriated by act of parliament; and the other, postponing the Mutiny Bill, were moved by Fox and carried by a considerable majority. The object of these resolutions was to render an immediate dissolution impracticable. Resolutions against the ministers and against the mode of their appointment, together with addresses to the crown for their dismissal, followed. But the majority against ministers, which at first had been formidable, fast dwindled down; and after the king had twice refused his assent to their dismissal, he dissolved the parliament. The last effort of the opposition had been the carrying of a representation to the crown, which, written by Fox, pointed out forcibly and at length the evils of an administration that was at variance with a majority of the representatives of the people.

Fox was again elected for Westminster; but Sir Cecil Wray, the unsuccessful candidate, having demanded a scrutiny, the high bailiff took upon himself to make no return of representatives for this city. Fox was in consequence compelled to appear in parliament as member for a Scotch borough; but the conduct of the high bailiff was one of the first matters brought before the house on its meeting. The Westminster scrutiny was one of the chief questions agitated for some time. Mr. Pitt and his friends did all that party and personal animosity could suggest to prevent, or at any rate to delay, the announcement of Fox's election for Westminster; and it was not until after a struggle of a year's duration that the scrutiny was stopped and the return ordered to be made. In the beginning of the subsequent year, 1786, the question of Mr. Hastings's Indian administration was first brought forward by Mr. Burke; but the trial did not begin before 1788 From the commencement to the close of this affair, in all the preliminary discussions, in the preparation of the articles of charge, and in the managing of the impeachment, Fox took a most active part. Towards the end of the year 1788 the king's illness rendered it necessary to resort to a regency. Fox now violently opposed the course proposed to be taken by Mr. Pitt; and while the latter contended that it was for the two houses of parliament to appoint the regent, Fox maintained that the regency belonged of right to the Prince of Wales. Holding this opinion, he opposed a motion made in the first instance by the minister for a committee to inquire into precedents, and subsequently a bill tending to limit the powers of the regent. It so happened that the king's speedy recovery rendered it unnecessary to bring the regency question to a conclusion; but it must be admitted that the ground taken up by Fox upon this occasion was not a tenable ground, any more than the ground taken up by the minister. The case which now came before parliament was a new and unforeseen case, a case unprovided for by the constitution. There was consequently no right in the matter; there was neither a right attaching to the lords and commons, as was maintained by Mr. Pitt, nor a right attaching to the Prince of Wales, as was contended by Mr. Fox. The question to be decided was which of two courses was the more expedient, not which was the legal one. And when both sides made it a question not of expediency but of right, both sides were wrong, and it is difficult to say which was the more so.

In the session of 1789 Fox distinguished himself by the support of a motion for the repeal of the Test and Corporation Acts. A year after he himself brought forward a motion for the same purpose. On the dissolution of parliament in 1790 he was again returned for Westminster, and at the head of the poll. On the meeting of the new parliament an attempt was made to get rid of the impeachment of Mr. Hastings, on the ground that it had abated by the dissolution, and that the new House of Commons could not proceed with what had been begun by the old one. Fox made a powerful speech in opposition to this view; he had on this occasion the support of Mr. Pitt, and it was carried against the lawyers by a large majority.

The discussions arising out of the question of the French Revolution, replete as they are with public interest, are also important in a life of Fox, on account of their having led to a termination not merely of his political alliance, but also of his friendship with Mr. Burke. The difference of their opinions on that great question had been shown so early as in February, 1790, during a discussion on the army estimates. At this time, however, each spoke of the other in terms of kindness and regard. But it was not always thus. When on the 6th of May, 1791, the Quebec Government Bill, or Bill for regulating the government of Upper and Lower Canada, came under discussion, Mr. Burke rose and was proceeding to deliver a violent diatribe against the French Revolution, when, after he had been several times ineffectually called to order, it was moved by Lord Sheffield, and seconded by Fox, 'that dissertations on the French constitution, and narrations of transactions in France, are not regular nor orderly on the question; that the claims of the Quebec Bill be read a second time.' The remarks made by Fox in seconding the motion, though there seems to have been but little in them calculated to irritate, irritated Mr. Burke; and when he rose to reply, he did so under the influence of strong excitement, and complained bitterly that he had not been treated by Fox as one friend should be treated by another. He observed, towards the conclusion of his speech, that it certainly was indiscreet at his time of life to provoke enemies, or give his friends occasion to desert him; yet if his firm and steady adherence to the British constitution placed him in such a dilemma, he would risk all; and, as public duty and public prudence taught him, with his last breath exclaim, 'Fly from the French constitution.' Fox here whispered that there was no loss of friendship. 'Yes, there is,' Mr. Burke exclaimed, 'I know the price of my conduct; I have done my duty at the price of my friend; our friendship is at an end.' At the conclusion of Mr. Burke's speech, Fox rose, but it was some minutes before his tears allowed him to proceed. So soon as he could speak, he pressed upon Mr. Burke the claims of a friendship of five-and-twenty years' duration,

but to no purpose. Mr. Burke remained relentless; and the breach was never made whole.

Fox distinguished himself during the same session of 1791 by his opposition to the ministerial project of an armament against Russia, by his support of Mr. Wilberforce's motion for the abolition of the slave trade, and by the introduction of a bill for the amendment of the law of libel. From the latter part of 1792 to 1797 his efforts were unceasing, first to prevent a war with France, and afterwards, when his warnings had been of no avail, and it had been entered into, to bring it to a close. During this period many of his friends, filled with alarm at the progress of events in France, and their probable influence on their own countrymen, left him to swell the majorities of the minister; and pitiable indeed were the minorities by which Fox's motions, one after the other, were supported; but this in no way daunted him. We must mention also the support which, in 1793, he gave to Mr. (now Earl) Grey's famous motion for parliamentary reform, his eloquent advocacy in 1794 of the cause of Muir and Palmer, the Scottish martyrs, his indefatigable opposition to the treason and sedition bills of 1795, and his attempt to procure attention to the state of Ireland and to the grievances of Irish Catholics, by a motion made in 1797, as additional important incidents during that period of his career, the principal object of which was opposition to the first French revolutionary war.

On the 26th of May, 1797, Mr. Grey made a second motion on the subject of parliamentary reform. Fox took this opportunity of announcing a resolution which he had formed to discontinue his attendance at the house, seeing that he and his friends were destitute of power to carry out their views. It is perhaps a question whether such a step as this can be taken by a member of the legislature without dereliction of duty, even though it may be a means of influencing the public mind, and, through it, the legislature, and though the consent of the member's special constituents may have been procured thereto. But, at the same time, it would be unjust to apply to the conduct of individuals acting under a very defective system of representation, tests which spring from, and form parts of, a perfect theory. The five years then, from 1797 to 1802, were passed by Fox principally at St. Ann's Hill, in retirement, and in the pursuits of literature. It was during this period of retirement that he formed the project of his 'History of the Reign of James II.' A dissolution of parliament took place in June, 1802, and Fox, whose popularity with his constituents had not been a whit diminished by his absenting himself from the house, was again returned for Westminster. Almost immediately after his re-election he paid a visit to Paris, principally for the purpose of collecting documents for his projected historical work. During his stay in Paris it is said that he was treated with marked attention by Napoleon.

Mr. Pitt had retired from office in March, 1801, on finding himself unable to procure the king's assent to the measure of Catholic emancipation; and he had been then succeeded by Mr. Addington. The new ministers had almost immediately set about negotiations for peace with France; and when the preliminary articles, signed at London on the 1st October, 1801, had come under discussion in the House of Commons, Fox had emerged from his retirement to express his joy at the prospect now opened of a conclusion of the war, and to give his best support to the ministry. He appeared again in his place on the meeting of the new parliament, in the autumn of 1802, still hoping to contribute to the bringing about of peace, but beginning by this time to doubt the sincerity of the ministers. A message from the crown, in May, 1803, announced that the negotiations were broken off. The following year Mr. Addington resigned office, having completely shown his unfitness for the discharge of its duties, and unable to stand against an opposition which included both Fox and Pitt. It was now hoped that Mr. Pitt, to whom was intrusted the making of the ministerial arrangements, would be able to avail himself of the services of Fox, by whose side, though not in recognized conjunction, he had been now sitting for some time in opposition. But the king would not hear of Fox being admitted to office. Lord Grenville, Lord Spencer, Mr. Windham, and others, who, like Mr. Pitt, had been latterly co-operating with Fox, refused to take any part in an administration from which Fox was excluded; and Mr. Pitt was thus compelled to throw himself upon the scattered subordinates of the Addington ministry. Peace came not from this ministry. On the 23rd of January, 1806, Mr. Pitt's death dissolved it; and in the new ministry which was formed under Lord Grenville, Fox was appointed secretary for foreign affairs. His life was spared but for seven months longer; but during this short period he did much towards the abolition of the slave-trade, which had ever been one of the objects that he most cared for, and he entered zealously into negotiations for peace with France, which it was a heavy misfortune to his country that his death did not allow him to complete. He died on the 13th September, 1806, in the 58th year of his age. The complaint which caused his death was water on the chest.

Such is a brief sketch of the public life of Fox. With the exception of the first six years of it, in which he was either a supporter or a member of a court administration, it was in substance consistent. From the beginning to the end it was honest. There are parts of his public life certainly which have led others to call his honesty into question, and to deny to him the quality of consistency; and of these parts, or at any rate of some of them, there are those among his friends and admirers who have professed disapprobation. Such parts are his early connexion with the court, his coalition with Lord North, and, shortly before his death, his coalition with Lord Grenville. Mr. Hazlitt has observed that 'his life was deficient in the three principal points, the beginning, the middle, and the end. He began a violent tory, and became a flaming patriot out of private pique; he afterwards coalesced with Lord North, and died an accomplice with Lord Grenville.' (*Political Essays and Public Characters*, p. 377.) The charge that he was actuated by private pique when, in 1774, he became an opponent of Lord North's ministry, has been already met, so far as it is possible to meet a charge which it is so very easy to make. But in a case where no unworthy motives have operated to produce a change of course, and it proceeds from change of opinion, it is for a vulgar mind alone to make this a ground of attack and abuse. And equally vulgar is that view of a statesman's duty which would prevent him from ever entering into alliance with one to whom at a previous period he may have been opposed, even though the question or questions on which they differed may now have been settled, and there may only remain questions upon which they are agreed. Though Mr. Fox was not, in the full and strict sense of the term, a philosophic statesman, he came nearer to it perhaps than any other English statesman, not even excepting Mr. Burke. His speeches always display in a preeminent degree a sense of the importance of principle. Sir James Mackintosh has said of him, as an orator, that 'he possessed above all moderns that union of reason, simplicity, and vehemence, which formed the prince of orators. He was the most Demosthenean speaker since the days of Demosthenes.' Fox's speeches were collected, and published in six volumes with a short biographical and critical introduction by Lord Erskine, in 1825. The fragment which he left of his projected history of the reign of James II. was published in 1808, with a preface by Lord Holland.

FOX ISLANDS. [ALEUTIAN ISLANDS.]

FOXGLOVE. [DIGITALIS.]

FOY, MAXIMILIAN SEBASTIAN, one of the best, if not the first, of the political orators that have appeared in France since the establishment of a constitutional charter, was born in 1775, at Ham, in Picardy. His father, an old military officer, died when Foy was only five years old, and the education of his five children devolved on their mother, Elizabeth Wisbeck, who was a woman of English extraction, and of a superior character. Foy displayed from his earliest boyhood remarkable talents and great application. He made considerable proficiency in Latin, and produced some well-written little compositions in his own language, when he was only nine years old. At fourteen he completed his course of studies at the college of Soissons, after which he passed to the military school of Lafere, and, at the end of 1790, entered the army as a second lieutenant of artillery. He served with great credit in Flanders during the beginning of the war of the Revolution. Having however frankly expressed his opinions about the horrors perpetrated at Paris, he was imprisoned at Cambray, but was released from his confinement by the events of the 9th Thermidor. He now re-entered the army, made two campaigns under Moreau, and rose to the rank of a chef d'escadron, when the treaty of Campo Formio suspended his military career. He took

advantage of the short peace which followed that treaty to study public law under the celebrated Professor Koch at Strasburg. In 1798 he again joined the army, and served in Italy, Switzerland, and on the Rhine, till the peace of Amiens, when he returned to France with the rank of colonel. Foy was at Paris during the trial of Moreau, and he expressed himself against that proceeding with so much animation, that he would have been arrested if he had not left the capital and joined the camp of Utrecht, where he refused to sign a congratulatory address to the first consul on the occasion of his escape from the conspirators' plot. He was very far from approving of any such schemes, but he gave no credit to the accusations against Moreau, under whom he had a long time served. Being a sincere republican, he voted against the election of Bonaparte to the imperial dignity. Notwithstanding that circumstance, Napoleon employed Foy, but left him a long time without promotion. In 1807 Foy was commissioned by Napoleon to conduct 1200 French cannoniers to assist Sultan Selim II. against Russia, but the revolution which took place at Constantinople prevented their departure. Foy himself went however to Constantinople, where he assisted the Turks in making dispositions for the defence of the Dardanelles. From Constantinople he went to Portugal, distinguished himself in many battles, received several wounds, rose to the rank of lieutenant-general, and continued to serve during all the peninsular war, till he received a severe wound at the battle of Orthez. He was employed at the Restoration by the Bourbons, but joined Napoleon after his landing from Elba, and fought bravely at Waterloo, where he was again wounded. From that time he retired from military service, and devoted himself entirely to the study of history, political and military science, to which he had previously applied all his leisure time. In 1819 Foy was chosen deputy of the department of Ain, and the talents which he displayed in the new career now opened to him surpassed the most sanguine expectations of his friends. His début in the parliamentary field was an eloquent defence of the rights of his old companions in arms, the veterans of the imperial army, whom the organs of the Restoration sought to deprive of their well-earned rewards. He vigorously attacked the lavish expenditure of public money for the maintenance of useless establishments, and to support the instruments of an anti-national party; but he was always a steady advocate of every expenditure which was requisite for the support of the power and dignity of a great nation. Foy had a hard battle to fight against the retrograde party, which sought to destroy the effects of the constitutional charter by introducing into the electoral body the privileges which had been abolished by the above-mentioned charter. Yet the noble efforts of Foy and of a patriotic minority were unavailing against the party, which, according to an expression of Foy himself, reckoned in the legislative chamber two members to one, and in the nation one individual in a thousand. Counter-revolutionary measures followed one another; the elective franchise was restricted, the liberty of the press curtailed, independent writers prosecuted, and the constitutional government of Spain overturned by a French expedition. Notwithstanding all these defeats of the liberal party, Foy never deserted the post where he was placed by the confidence of his countrymen, and he castigated the unprincipled proceedings above referred to with an eloquence worthy of Cicero exposing the exactions of a Verres or the plots of a Catiline. When provoked by his enemies, who never lost an opportunity to attack him in a most annoying manner, he sometimes burst out into the most eloquent but bitter invective. On one occasion, being interrupted in the midst of a speech by a sneering question, what he meant by the expression *aristocrats?* he made an answer which has been perpetuated in the annals of the French parliamentary debates: 'The aristocracy of the nineteenth century,' said he, 'is the coalition of all those who wish to consume without producing, to live without working, to occupy all situations without being able to discharge the duties attached to them, to possess all the honours without having deserved them—this is the aristocracy.'

In November, 1825, Foy began to suffer from the symptoms of an aneurism: he felt his end approaching, but remained calm and collected under the most severe sufferings, till his death on the 28th November. His death was considered in France as a national calamity; his funeral was attended not only by his political friends, but even by his opponents who no longer refused to pay the tribute of just admiration to a deceased adversary. As he left a family in rather straitened circumstances, one million of francs was raised for them by a national subscription. Foy left two volumes of speeches, and a History of the Peninsular War, a work which is much esteemed, but unfortunately has not been completed. It is particularly characterized by the fairness with which it treats the opponents of France during that memorable struggle, and it has been warmly eulogized not only in France but even in England by writers professing political opinions completely opposed to those of General Foy.

FOYLE, LOUGH, a bay on the northern coast of Ireland, whose narrow entrance is 7° west of Greenwich. It extends from south-west to north-east about fifteen miles, and is in the middle eight miles and three quarters wide, but it narrows towards both extremities. Its mouth between Magilligan Point on the east, and Green Castle on the west, is less than a mile across. The bay, being much encumbered with shoals, requires some attention in navigating it. The deepest water is along the west side, both of the lake and its mouth. Near Green Castle there are from eight to ten fathoms water. In front of the entrance is a sand-bank called the Tuns, over which the sea sometimes breaks with great violence. Vessels of 400 tons and upward may ascend the Lough and the river Foyle, which falls into its southern extremity, as far as Londonderry.

FRACASTO'RO, HIERO'NYMUS, one of the most learned men of his time, as well as one of the best modern Latin poets, was born at Verona, in 1483, of an antient family. From his earliest youth he applied himself to the study of the sciences, particularly to medicine, and he became professor of logic at the university of Padua when he was only nineteen years old. Fracastoro died in 1553. He enjoyed during his lifetime the esteem and friendship of many eminent men of his time, and Ramusio, who owed to Fracastoro the idea as well as many materials for his collection of the 'Navigazioni et Viaggi,' erected a brass statue to his memory at Padua. Julius Cæsar Scaliger was such an admirer of Fracastoro's poetical talents that he wrote a poem in his praise, entitled 'Aræ Fracastoriæ.' The principal works of Fracastoro are, 'Syphilides, sive morbi Gallici, libri tres,' published at Verona, 1530, in 4to; at Paris, 1531 et 1539, in 8vo and in 16mo; Basil, 1536, in 8vo; Lyons, 1547, in 12mo; Antwerp, 1562 and 1611, in 8vo; London, 1720, in 4to, and 1746 in 8vo; Padua, 1744, in 8vo. It has been translated into French by Maquer et Lacombe, Paris, 1753, in 12mo; into Italian by Antonio Tirabosco, Verona, 1739, in 4to; by Pietro Belli, Naples, 1731, in 8vo; by Sebastian degli Antonii, Bologna, 1738, in 4to; the best Italian translation is however that of Vizentio Benini de Colonia, published, with the complete collection of Fracastoro's works, at Padua, 1739, in 4to. Fracastoro's reputation rests chiefly on this work, which he dedicated to Bembo, who was his particular friend, in a poetical epistle, of which Roscoe has given an English translation in his life of Leo X. In this poem Fracastoro rejects the commonly-received opinion that the disease, which is the subject of his poem, was imported from America, and argues that it was known in antient times, and was generated by the corruption of the atmosphere, to which he attributes the origin of all diseases that attack the animal and vegetable creation. He recommends as a means of eradicating that fatal disease the use of mercury, and he describes the discovery of that remedy in a fiction full of the greatest poetical beauties. The hero of the poem is a young man called Syphilis, who is attacked by that disease, not in consequence of any profligacy, but by the wrath of Apollo, and is cured by plunging three times into the streams of quicksilver, which flow in the subterraneous regions. It is remarkable that the name of the hero from which the title of the poem is derived gave birth to the technical appellation by which the above-mentioned disease is known. It seems that in adopting such a subject for his poem Fracastoro wished to display in one work his extensive knowledge in the various branches of natural philosophy, his skill in medicine, and his admirable genius for Latin poetry. Many critics have compared the Syphilis to the Georgics of Virgil, and Sannazaro, the contemporary of Fracastoro, declared it to be superior to his own Latin poem 'De partu Virginis,' on which he was for twenty years. Besides the poem of 'Syphilis,' Fracastoro published the following works: 'De Vini Temperatura,' Venice, 1534, in 4to; 'Homocentricorum, sive de Stellis, liber unus' de Causis Criticorum dierum, libellus,' Venice,

1535, in 4to; 1538, 8vo; 'De Sympathiâ et Antipathiâ Rerum, liber unus; de Contagionibus et Contagiosis Morbis, et eorum Curatione, libri tres,' Venice, 1546, in 4to. Fracastoro began a poem entitled 'Joseph,' but he was prevented by death from finishing more than two cantos. He also left a volume of Latin poetry on different subjects, addressed to several eminent personages of his time. All these poetical productions were collected and published at Padua, 1728, 8vo. The complete works of Fracastoro appeared for the first time at Venice, 1555, in 4to, and they were reprinted in the same town in 1574, 1584, 4to; Lyon, 1591; Montpelier, 1622; Geneva, 1621, 1637, and 1677. The beautiful poem of Fracastoro entitled 'Aleon, sive de Cura Canum Venaticorum,' which many critics consider as scarcely inferior to the 'Syphilis,' appeared only in the editions of his complete works published after the sixteenth century, and it seems to have never been separately printed. For further particulars about Fracastoro and his works, see Tiraboschi's *Storia della Litteratura Italiana;* Ginguené, *Histoire de la Littérature Italienne;* and Roscoe's *Life and Pontificate of Leo the Tenth.* A German author of the name of Mencken wrote in Latin a Commentary on the Life and Writings of Fracastoro, which was published at Leipzig in 1731, in 4to.

FRACTIONS, COMMON AND DECIMAL. By a fraction is meant, in the first instance, a part of any magnitude. Thus, 'three and a fraction' means three units and a part of a fourth. The next meaning of the term confines fractions, in an arithmetical point of view, to the *aliquot* parts or *submultiples* of the unit; which unit must therefore be divided into a number of equal parts, of which parts a certain number is to be taken.

Under the heads ADDITION, &c. will be found the various rules by which operations containing fractions are conducted. We shall here confine ourselves to fundamental points connected with the theory.

A fraction is thus denoted: $\frac{a}{b}$ means the quantity obtained by dividing a unit into b equal parts and taking a of those parts. If a be greater than b, it will obviously be necessary to divide more units than one, each into b equal parts, until enough have been subdivided to furnish the a parts required. It was usual, in English works on arithmetic, to call fractions in which a is less than b, *proper* fractions; and all others *improper* fractions: this absurd distinction is now beginning to be abolished. In the preceding fraction a is called the *numerator*, and b the *denominator*. The first term is correct, for a is the number of parts of a certain kind which are to be taken; the second is not quite so correct, for the denomination of which the number a is to be taken, is not b, but $\frac{1}{b}$; the bth part of a unit (not b units) is to be repeated a times.

The preceding fraction may be considered in several different ways. It is 1st, the bth part of a unit repeated a times; or, in common language, a-$b$ths of a unit; 2nd, the number of times, or parts of a time, or both, which a contains b; 3rd, the proportion which a is of b; 4th, the expression which ought to be written for a, on the supposition of that which was b units being made the unit. Thus $\frac{2}{5}$ expresses two-fifths of a unit, the part of a time which 2 contains 5, the proportion which 2 is of 5, and the expression which must be written for what is now 2, when that which is now 5 is made the unit. All these meanings, *except the first*, are perfectly intelligible when we write a fraction in which the terms are both fractional. Thus

$$\frac{1\frac{1}{2}}{3\frac{2}{7}} \quad \frac{6}{1\frac{1}{4}} \quad \frac{\frac{2}{3}}{\frac{5}{6}} \quad \frac{3\frac{2}{7}}{\frac{1}{7}}, \text{ \&c.}$$

may be thus explained. We can readily imagine the part of a time which $1\frac{1}{2}$ is of $3\frac{2}{7}$, the proportion which the first is of the second, and the expression which must be substituted for $1\frac{1}{2}$ when a larger unit is used, amounting to $3\frac{2}{7}$ of the present unit. But though we see clearly what is meant by dividing 1 into 3 equal parts and into 4 equal parts, what idea are we to attach to the division of 1 into $3\frac{2}{7}$ equal parts?

The generality of mathematical conceptions is frequently destroyed by the peculiar idiom of a language. The science of arithmetic requires the abolition of all those distinctions which depend on singular and plural, noun and pronoun, &c. Thus, when we speak of the answer to a problem being a number of feet (unknown), it is better to allow the word to imply a part of a foot, a foot itself, or a number of feet together with a part of a foot, than to repeat all those possible cases every time a number is to be mentioned. Again, when one particular phrase seems absurd, but another which is synonymous appears clear, we must either reject the former altogether, or attribute to it the meaning of the latter, and the second course is generally the more convenient. We now observe that the direction to 'divide *one* into 10 equal parts' is the same as 'find a part such, that ten of them shall make a unit.' Now there is no absurdity in requiring to 'find a part such that $3\frac{2}{7}$ of them shall make a unit,' though it is inconsistent with our idiom to speak of 'dividing 1 into $3\frac{2}{7}$ equal parts.' The meaning of the phrase which is intelligible should then be extended to that which is not, or 'to divide 1 into $3\frac{2}{7}$ equal parts' should mean that the part is to be found which repeated 3 times and $\frac{2}{7}$ of a time shall give the unit. And this must be extended even to the case in which the number or fraction thus obtained is greater than a unit. Thus in the fourth of the preceding fractions such a number or fraction must be found, that $\frac{1}{7}$th of it shall be a unit; that is,

$$\frac{1}{\frac{1}{7}} \text{ stands for the number } 7;$$

and this must be repeated $3\frac{2}{7}$ times. The preceding considerations show that fractions with fractional denominators may be explained (without reference to any rule of reduction) by an extension of the definition which applies to integer denominators. The use of such an extension is as follows:—at present, algebraical students learn results which are perfectly intelligible with regard to whole numbers, or to fractions with integer terms, but of which they do not see the meaning when fractional or mixed terms are employed. In the latter case they trust to what they see in the former that their results will remain true; but they can have no distinct perception on this point until they have learnt to include every possible form of $\frac{a}{b}$ under one definition.

The fundamental property of fractions on which all others depend, is this—that no fraction is changed in value by multiplying or dividing both its terms by the same number or fraction, that is—

$$\frac{a}{b} = \frac{ma}{mb}$$

whatever may be the values of a, b, and m. This result should be studied in all the variety of its cases, from such as

$$\frac{3}{5} = \frac{3 \times 10}{5 \times 10} \text{ to such as } \frac{2\frac{1}{2}}{\frac{15}{7}} = \frac{2\frac{1}{2} \times 1\frac{1}{3}}{\frac{15}{7} \times 1\frac{1}{3}}$$

There is another theorem which is much neglected in elementary works, but which is of considerable importance, namely, that if the numerators of two fractions be added for a numerator, and their denominators for a denominator, the resulting fraction must lie between the two from which it was derived. Thus of the three fractions,

$$\frac{2}{7}, \quad \frac{6}{11}, \quad \text{and } \frac{2+6}{7+11} \text{ or } \frac{8}{18}$$

the third is greater than the first, but less than the second.

In practice it is convenient to employ fractions having either the same denominators, or which may easily be reduced to others of equal value having the same denominators. The numbers 10, 100, 1000, &c., suggest themselves for this purpose: indeed it may immediately be seen that the ordinary system of decimal numeration may be extended so as to allow of a representation of such fractions. If we consider the number 11111, we see that for every step which we make to the right, we find a unit which is only the tenth part of the preceding unit. Place a point after the unit's place (to mark its position), and let the same method of valuation be carried further. Then in 11111·1111, the first 1 after the point should stand for one-tenth of the preceding, or one-tenth of a unit; the second for one-tenth of a tenth, or one-hundredth, and so on. The fundamental theorem of decimal fractions, in this view of the subject, is that which shows, for example, that 12·2345 (defined to mean 1 ten, 2 units, 2 tenths, 3 hundredths, 4 thousandths, and 5 ten-thousandths) is the same as 122345 ten thousandths; or that all the number, such as it would

be if the units' column were on the right, may be taken as a numerator, and the denomination of the right hand figure as a denominator. Thus—

$$65{\cdot}483 \quad \text{or} \quad 60 + 5 + \frac{4}{10} + \frac{8}{100} + \frac{3}{1000}$$

$$\text{is} \quad \frac{60000}{1000} + \frac{5000}{1000} + \frac{400}{1000} + \frac{80}{1000} + \frac{3}{1000}$$

$$\text{or} \quad \frac{65483}{1000}$$

No fraction can be reduced to an equivalent decimal fraction, if its denominator contain any prime factor except 5 or 2 (the divisors of ten). But this is of no consequence in practice, since it may easily be shown that for any fraction can be found a decimal fraction which shall be as near to it as we please. For instance, suppose it required to find a decimal fraction which shall not differ from $\frac{3}{41}$ by so much as the hundred thousandth part of a unit. Then—

$$\frac{3}{41} = \frac{300000}{4100000} = \frac{\frac{300000}{41}}{100000} = \frac{7317\frac{3}{41}}{100000}$$

or 7317 hundred thousandths of a unit differs from $\frac{3}{41}$ by only $\frac{3}{41}$ of the hundred thousandth of a unit, or by less than the hundred thousandth part. It is from such a transformation that the common rule is derived.

It is common to say that a result is true to a certain number of places of decimals when any alteration of any place would make it further from the truth. Thus, the diameter of a circle being unity, the circumference lies between 3·1415 and 3·1416, but nearer to the latter; whence the same circumference, true to four places of decimals, is 3·1416. Similarly 62·13299, taken true to two places, is 62·13; to three, 62·133; to four, 62·1330. Again, ·625, taken true to two places, might be either ·62, or ·63; but the latter is generally taken. When a decimal fraction cannot be found exactly equal to a given common fraction, the division by which the numerator is found, leads to what is called a CIRCULATING DECIMAL.

For subjects closely connected with the theory of fractions, see RATIO; PROPORTION; INCOMMENSURABLE.

FRACTIONS, CONTINUED. A continued fraction is one which has a fraction in its denominator, which again has a fraction in its denominator, and so on: such as

$$\cfrac{1}{2 + \cfrac{3}{7 + \cfrac{6}{1 + \cfrac{2}{3}}}}$$

A more convenient way of writing such fractions is desirable; in the present article we shall adopt the following:

$$\frac{1}{2+}\;\frac{3}{7+}\;\frac{6}{1+}\;\frac{2}{3}$$

$$\text{Thus} \quad \cfrac{a}{b + \cfrac{c}{d + \cfrac{e}{f}}} \quad \text{is written} \quad \frac{a}{b+}\;\frac{c}{d+}\;\frac{e}{f}$$

The use of continued fractions is as follows:—by converting a common fraction, with a large numerator and denominator, into a continued fraction, we are able to find a succession of more simple fractions, which are alternately greater and less than the given fraction, and approach to it with great rapidity. Let $\frac{a}{b}$ be the given fraction, a being less than b; proceed as in the rule for finding the greatest common measure of a and b, and let q, r, s, t, &c., be the quotients obtained in the process; then

$$\frac{a}{b} = \cfrac{1}{q + \cfrac{1}{r + \&c.}} \quad \text{or} \quad \frac{1}{q+}\;\frac{1}{r+}\;\frac{1}{s+}\;\frac{1}{t+}\;\&c.$$

For instance, let the fraction be $\frac{5119}{28319}$

```
5119) 28319 (5              ⎫ &c., as in the method
  Rem. 2724) 5119 (1        ⎬ of finding the greatest
           2395) 2724 (1    ⎭ common measure.
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The succession of quotients thus obtained is

5, 1, 1, 7, 3, 1, 1, 2, 1, 3, 1, 2;

which are to be used as follows in forming the succession of approximate fractions. The first and second are always

$$\text{1st} \quad \frac{1}{\text{first quotient}} \quad \text{in this case } \frac{1}{5}$$

$$\text{2nd} \quad \frac{\text{2nd quotient}}{\text{1st. qu.} \times \text{2nd qu.} + 1} \quad \ldots\ldots \quad \frac{1}{5 \times 1 + 1} \text{ or } \frac{1}{6}$$

To form the succeeding numerators and denominators there is one uniform rule for both, as follows:—multiply the last found term by the first quotient remaining to be used, and add the last but one; as in the following process, where * denotes that the incoming quotient is unity, and that the multiplication is therefore unnecessary.

	Numerators.	Denominators.
1st	1	5
2nd	1	6
3rd *	2	11
New quotient	7	7
	14	77
	1	6
4th	15	83
New quotient	3	3
	45	249
	2	11
5th	47 *	260 *
	15	83
6th	62 *	343 *
	47	260
7th	109	603
New quotient	2	2
	218	1206
	62	343
8th	280 *	1549 *
	109	603
9th	389	2152
New quotient	3	3
	1167	6456
	280	1549
10th	1447 *	8005 *
	389	2152
11th	1836	10157
New quotient	2	2
	3672	20314
	1447	8005
12th	5119	28319

The succession of fractions continually approximating to the given fraction, and ending in it, is then

$$\frac{1}{5},\ \frac{1}{6},\ \frac{2}{11},\ \frac{15}{83},\ \frac{47}{260},\ \frac{62}{343},\ \frac{109}{603},\ \frac{280}{1549},\ \frac{389}{2152},$$

$$\frac{1447}{8005},\ \frac{1836}{10157},\ \frac{5119}{28319};$$

these approach nearer and nearer to the last, than which they are alternately greater and less; the first greater, the second less, the third greater, and so on: but the second is not so much too small as the first is too great, nor the third so much too great as the second is too small, &c. The error committed by assuming any one of the approximate fractions instead of the final result, is less than a fraction having unity for its numerator, and the product of the denominator in question and the next denominator for its denominator. Thus—

$$\frac{1}{5} \text{ is not wrong by } \frac{1}{5 \times 6} \text{ or } \frac{1}{30}$$

$$\frac{1}{6} \quad \ldots\ldots\ldots \quad \frac{1}{6 \times 11} \text{ or } \frac{1}{66}$$

$$\frac{2}{11} \text{ is not wrong by } \frac{1}{11 \times 83} \text{ or } \frac{1}{913}$$

$$\frac{15}{83} \cdot \cdot \cdot \cdot \cdot \frac{1}{83 \times 260} \text{ or } \frac{1}{2158}, \text{ \&c.}$$

If it be desired to verify one of the fractions without proceeding to the end of the process, observe that the numerator of the difference of any two succeeding fractions is unity. Thus—

1×6	exceeds	1×5	by	1
1×11	falls short of	2×6	by	1
2×83	exceeds	15×11	by	1
15×260	falls short of	83×47	by	1 &c.

No fraction, having a less denominator than one of the approximate fractions, can come so near to the original fraction as the one which is obtained by the process. Thus, $\frac{109}{603}$ is nearer to $\frac{4119}{22316}$ than any possible fraction which has an integer numerator, and an integer denominator less than 603.

FRACTIONS, VANISHING. This term is applied to fractions in cases where a supposition is made which destroys both numerator and denominator at the same time. Thus—

$$\frac{x^2 - 1}{x - 1} \qquad \frac{\log. x}{x - 1}, \qquad \frac{a^x - a}{b^x - b},$$

are fractions which all assume the form $\frac{0}{0}$, when $x = 1$: that is, though for any other value of x they represent operations of ordinary arithmetic, yet in the particular supposition that x is unity, they all end in a direction to find out how many times *nothing* is contained in *nothing*. The first answer to this seems to be that the fraction may, in such a case, have any value we choose to assign, for nothing taken once, or twice, or thrice, &c., is still nothing: that is to say, according to the rules of common algebra, since $0 = 0 \times a$, whatever a may be, it follows that 0 divided by 0 may be a. But this is carrying operations which are defined with regard to magnitudes further than is contemplated in their definition, and applying them to a symbol which simply represents the absence of all magnitude. Such a process may then be rejected without scruple.

But this question remains: granting that the preceding reasoning does not entitle us to give the preceding fractions any value we please, can they be said to have a value at all when $x = 1$? To settle this point in part, we must ask not what the preceding fractions are when x is unity, but what becomes of their value when x is made to approach nearer and nearer to unity. To take the first as an instance, we find that

$$\frac{x^2 - 1}{x - 1} = x + 1 \text{ for all } \textit{values} \text{ of } x.$$

Consequently—I. Whenever x is greater than 1, the fraction is greater than 2. II. As x approaches to 1, the fraction approaches to 2. III. The fraction may be made as near to 2 as we please by making x sufficiently near to unity. Hence it follows that if when $x = 1$, the fraction have a value at all, that value must be 2. Similarly it may be proved of the second and third fractions that if they *have* values when $x = 1$, these values must be 1 and $\frac{a \log a}{b \log b}$.

Much discussion has arisen as to whether vanishing fractions have values or not, as if such a question could be one of deduction from the ordinary reasonings with regard to magnitude. The truth is, that any one may either assert that such fractions have values, or may altogether refuse to consider them, according to his ideas of convenience or propriety. Nobody doubts that if the answer to a problem were

$$\text{'}y = \text{the value of } \frac{\log x}{x - 1} \text{ when } x = 1,\text{'}$$

one of two courses must be taken; either the value of y must be declared to be unity, or the evanescent form of the fraction must be recognized as arising from a misconception of the problem, by which factors of the form $x - 1$ (where $x = 1$) have been used under the idea that they were of the form $x - 1$ (where x is not $= 1$): the problem must then be reconsidered, and the (so called) mistake corrected. But the correction will always lead to the result $y = 1$, and those who employ the second method in preference to the first will not deny that they knew as much when they first saw their (so called) erroneous result.

It is not worth while to discuss the particular arguments used with respect to the isolated question of vanishing fractions, since the difficulty raised with regard to them belongs to a class of questions so extensive that they might form the subject of a separate science. Under the heads, NOTHING—INFINITY—LIMITS, THEORY OF—&c., will be found those considerations which apply to all the cases.

The method of finding the value (or correction, if the reader please) of a vanishing fraction whose numerator and denominator disappear when $x = a$, is to make a new fraction with the differential coefficients of that numerator and denominator, and then to substitute a for x. If the result be still a vanishing fraction, repeat the process with new differentiations, and so on. Thus to find the value of the third fraction above mentioned—

$$\text{diff. co. of } a^x - a \quad \text{is} \quad a^x \log a$$

$$\text{diff. co. of } b^x - b \quad \text{is} \quad b^x \log b$$

$$\frac{a^x \log a}{b^x \log b}, \text{ when } x = 1, \text{ is } \frac{a \log a}{b \log b}.$$

FRACTURE. Injuries complicated with the breaking of a bone are called fractures.

The comparative importance of such accidents depends in the first place upon that of the bone which is broken. The most dangerous fractures in this point of view are those of the vertebræ and skull, which inclose organs immediately essential to life, and extremely susceptible of injury. The *processes*, or projecting parts, of the vertebræ are sometimes broken without very serious consequences; but if any of the rings of bone which encompass the spinal chord be thus injured, death almost certainly ensues, and the danger is imminent in proportion to the nearness of the injured vertebra to the head. If the fracture take place above the fourth vertebra of the neck, reckoning downwards, death is generally instantaneous from paralysis of the nerves of respiration. Fracture of the *basis* or floor of the skull is often instantly fatal, for analogous reasons. The *sternum*, or breast-bone, and ribs, cover parts not so immediately essential to life, and, for many reasons, not so liable to suffer from violence done to their external defences as those to which we have already adverted. Fracture of the sternum can scarcely happen without the direct application of considerable force; and for that reason is both serious and rare. The ribs, on the contrary, are more easily and frequently broken than any other bones; and generally speaking the consequences are not at all serious, if proper measures be adopted. The fracture unites readily; and the chief danger to be apprehended is inflammation of the serous membrane called the *pleura*, which lines the cavity of the chest, or of the lung. [PLEURISY; PNEUMONIA.] This danger is of course increased if the lung be wounded by the splintered ends of the bone, which is sometimes the case, especially when the fracture is the result of direct force. The bones of the pelvis are seldom broken, for the same reason that determines the rare occurrence of fracture of the sternum; but the accident is generally serious, and not unfrequently fatal, from injury to the bladder and other important organs included in the pelvic cavity, or connected with the bones which circumscribe it. Fractures of the bones of the face, though distressing and painful at the time, generally do well; and are of consequence chiefly on account of the disfigurement they sometimes occasion.

The limbs are so essential to the purposes of life, and their usefulness depends so much upon the preservation of the shape of their numerous bones, upon the integrity of their joints, and upon the free and separate mobility of their muscles and tendons, that anything calculated to injure them permanently in these particulars is a matter of serious importance. Hence the great interest that has always been attached to fractures occurring about these parts; none of which can be considered as slight accidents, for in various degrees they all threaten the future usefulness of the limb.

We feel that the subject of fracture, particularly of the limbs, is one that hardly admits of compression within moderate limits; and are aware that in attempting to compress it we must sacrifice order, if not perspicuity, to brevity. Our principal object however will be to give a clear explana-

tion of certain technical terms, by which important varieties of these injuries are distinguished; and which, though frequently made use of in conversation and in the course of judicial proceedings, are often misapplied or imperfectly understood: with this we shall interweave as much general information as possible, subjoining what may be necessary to complete an outline of the whole subject.

It can hardly be necessary to explain what is meant by *transverse* and *oblique* fracture: we may observe, however, that the distinction is practically of great consequence. In the first, or *transverse* variety, the bluntness of the ends of the broken bone in some measure preserves the contiguous soft parts from laceration at the time of the accident; it also opposes a considerable obstacle to the displacement which arises afterwards from muscular contraction; but it chiefly conduces both to the diminution of present suffering and to the prosperous event of the case, by facilitating the speedy and perfect restoration of the displaced bone to its proper situation, and its steady retention, when restored, by mechanical means.

On the other hand, as most of the bones liable to fracture are cylindrical, or present flattened surfaces meeting in as many solid angles, if they be broken obliquely, the ends of the bone will be sharp-edged or pointed: hence they are generally separated from each other to a much greater extent than is usual in transverse fracture, and there is not only much more suffering from the laceration of sensitive parts and from portions of them being included and pressed between the broken surfaces, but great difficulty is often experienced in disentangling the ends of the bone, and bringing them into close apposition; and still more in retaining them, from their tendency to slip past each other during the spasmodic and powerful contractions of the wounded and irritated muscles. The result of such fractures is often unsatisfactory, in spite of the utmost care and skill; and some distortion and shortening of the limb is inevitable in severe cases.

Comminuted Fracture.—When a bone is crushed, or fissured in more than one direction, so that portions of it are detached from the rest, the fracture is said to be comminuted. From the facility generally experienced in replacing the bone, or at least in straightening and supporting the limb in these cases, they often end better than apparently less serious oblique fractures. Perhaps one reason may be that the direct application of force, by which they are generally produced, has some effect in stunning the muscles and deadening the injurious influence of their contraction. If there be much contusion of the soft parts, considerable inflammation and fever may supervene, and the recovery will be tedious in proportion; but the eventual restoration of the natural shape and length of the limb is frequently more complete than might be expected.

Fracture extending into a joint.—A bone may of course be broken in the situation of a joint; or, if the fracture occur at some distance, a fissure may extend longitudinally into one of these cavities. This circumstance is a very important aggravation of the injury. The synovial membranes which line the joints are peculiarly impatient of irritation, and when they become inflamed, the constitutional disturbance is often considerable, and the attendant, or, as it is called, the *symptomatic* fever, is of a very acute type. When the larger joints, such as the knee, are concerned in injuries of this kind, the old surgeons frequently recommended amputation of the limb. Modern experience has shown that this may generally be dispensed with; but the greatest skill and watchfulness are required and often baffled in endeavouring to prevent the occurrence of a stiff joint (*anchylosis*), and to keep the limb in the most useful position, if it should occur; a position which is not always the most conducive to the ease, or indeed to the recovery, of the patient, and therefore not always eligible.

Fracture complicated with dislocation.—If a bone be dislocated as well as broken, it may be difficult or impossible to carry into effect the measures which are necessary for the satisfactory treatment of either injury, and the result is permanent distortion and crippling of the limb. This is of course an extreme case, and is not likely to happen unless the fracture take place very near the dislocated joint, so that a firm hold cannot be taken of the detached end of the bone. If however the fissure in the bone does not extend to the joint, the constitution does not, upon the whole, suffer so materially as might be expected in consequence of the double injury, except in particular cases, such as those complicated with traumatic delirium, on which, as the subject is curious, we shall here take occasion to say a few words.

Traumatic delirium (τραῦμα, *a wound*). This affection is by no means confined to fractures with dislocation, or to injuries of which fracture forms a part. It appears however to be more frequently a consequence of injuries of this nature than of others, and particularly of fracture of the fibula immediately above the ancle, which is often followed by dislocation of the foot. [FIBULA.] The patient rambles in his ideas, is generally very talkative, and in a state of great alarm and apprehension, expecting, for instance, to be led to execution for some fancied crime. He is commonly pale and cold, free from fever, and quite unconscious of pain. If not prevented, he will rise from his bed and move about the room, using his shattered limb with perfect unconcern. Traumatic delirium has some points of resemblance with delirium tremens, and, like it, occurs for the most part in over-stimulated and exhausted constitutions. It is sometimes fatal, but may generally be relieved by large quantities of wine and opium.

Compound fracture.—If the injury of which we are treating be confined to the bones and the parts immediately around them, the fracture is said to be *simple;* but if the bone be protruded through the skin, or an external wound otherwise inflicted communicate with the interval between the broken surfaces, the fracture is said to be *compound.* However small the wound in the skin may be,—unless it can be brought to heal by the first intention, which, though it rarely succeeds, should be always attempted,—this is by far the most serious aggravation of the injury, whether we regard the suffering of the patient, the progress of the case, or the prospect of recovery. A simple fracture, however extensive, if not into a joint, may generally be expected with confidence to be well enough to permit the accustomed use of the limb in a period ranging from two to eight weeks; the pain and constitutional derangement seldom lasting beyond a few days. But a compound fracture threatens life, and, speaking generally, is at best an affair of many months of suffering and sickness. This remarkable difference originates in the wide constitutional sympathies of the skin as an organ of sensation and secretion; in the importance of its function as a covering for the subjacent parts; and in its great proneness to become inflamed when the subject of a punctured and lacerated wound. It further results from the tendency of the inflammation to propagate itself from the edge of the skin along the track of the wound to the periosteum and other deep-seated parts; it commonly spreads very extensively in the cellular tissue between the muscles, under the aponeurotic expansions which invest and separate them, and within the synovial sheaths of their tendons. Some degree of inflammation among these parts takes place in simple fractures, but it seldom exceeds manageable limits, and the lower degrees of it may perhaps be considered as curative. But the inflammation which follows a compound fracture puts a stop to all the natural processes of restoration, and renders the artificial means, in other cases usefully employed to promote them, ineffectual or inapplicable. It is attended with incessant and exhausting fever, at first ardent and afterwards irritative and hectic [FEVER], and occasions deep-seated abscesses, extensive destruction of the soft parts (*sloughing*), and tedious separations of dead bone (*exfoliation*). Such are some of the disastrous consequences of a compound fracture, an accident which, in its severer forms, presents such a scene of suffering and a succession of such formidable drains upon the strength, that, on the balance of evils, amputation is often a preferable alternative.

Diagnosis of fracture.—Much need not be said of the means by which the existence of a supposed fracture may be ascertained. The nature of the accident is generally obvious enough, and the less the parts are handled the better: but where there is any doubt, it may be removed by attending to the grating sound, or the sensation communicated to the touch occasioned by slightly moving the broken ends of the bone against each other. This symptom is called *crepitation.*

Treatment.—The principles of treatment are, in the first place, to soothe by all possible and prudent means the muscular irritation and spasm which are the immediate and most urgent consequences of a recent fracture. The patient is to be placed in the easiest posture, which, if the thigh

or leg be broken, is generally on the same side or on the back; the limb is to be supported on soft pillows, the contiguous joints being half-bent in order to favour as much as possible the relaxation of each class of muscles, especially the flexors; gentle friction, warm fomentations, or cold evaporating lotions are to be used according to the circumstances of the case and the feelings of the patient.

When the relaxing rigidity of the muscles will permit, which may not be for some hours or days, the bone is to be restored as nearly as possible to its proper situation by the gentle application of force in any required direction. Violence would defeat its own object by reproducing spasm. One hand or an assistant should steady the upper portion of the limb while the lower portion is drawn down and turned till the proper length and bearings are restored. This process, which is called the *reduction* or *setting* of the fracture, cannot always be completed on the first attempt; and it is sometimes advisable, and indeed only possible, to effect it by degrees. The displacement may also return; and in oblique fracture this will certainly happen unless the case admits of a very fortunate adjustment of the bandages. The process we have described must then of course be repeated as often as circumstances may render it necessary. The setting of a broken limb is not, as people generally imagine, a piece of legerdemain, to be effected in a moment by some wonderful exertion of dexterity, and then to be announced in oracular phrase by the surgeon as if it were something too mysterious for a plain man to understand. It is a perfectly simple and straightforward measure; and little more than common sense and a gentle hand are necessary for its proper execution if it be possible to effect it at all.

When the limb is reduced, it is to be placed in *splints*, which are thin pieces of wood or other material of the requisite firmness and length, and suitably shaped and hollowed out to fit evenly without making undue pressure upon prominent points, such as the ankle. The skin is to be protected by folds of linen or thin soft pads a little wider than the splints, which are also useful to prevent them from slipping. When everything is properly arranged as to position, the splints are to be bound upon the limb with a moderate degree of pressure; and it is right to remove and re-adjust them occasionally, in order to detect and rectify any deviation from the correct line of the bone that may arise or become apparent as the swelling subsides.

Where there is no fear of the bone being displaced by the action of the muscles that are attached to it or by the restlessness of the patient, it is not necessary to apply splints, which are only useful in preventing motion, and otherwise rather retard the progress of the case by their pressure, and for other reasons.

In fracture of the ribs it is sufficient to apply a broad belt or bandage to prevent them from alternate depression and elevation in the act of breathing, which can be carried on sufficiently well by the diaphragm alone [RESPIRATION]: and all such means are inapplicable in many cases, such as fracture of the vertebræ and of the neck of the thigh-bone; where all that can be done of a mechanical kind is to place and keep the patient in a proper position. This can be done most effectually by the help of a bedstead invented by Mr. Earle, the frame of which is jointed, so that the back may be raised to any required inclination, the knees being also raised, and the feet, if necessary, bound to a cross-board. The mattress is provided with movable pieces, which preclude the necessity of change of position for any purpose. The paramount importance of constitutional treatment and a strict regulation of the diet need scarcely be adverted to in this as in all cases of injury, in which a primary object is to repress or prevent inflammation.

Union of fractured Bone.—The process by which fractured bones are united is generally uninterrupted in simple cases, if the constitution be good and the accompanying contusion not very considerable. The extravasated blood is soon absorbed, and the swelling and inflammation subside. The interior lacerations heal, and the soft parts round the ends of the fracture become consolidated with the periosteum, or fibrous investment of the bone, which swells and unites at the torn edge. In this consolidated mass, which forms a soft case for the bone for some distance above and below the fracture, but is thickest just at that point, particles and spicula of bone are gradually deposited, till at length it becomes rigid and firm, holding the ends of the bone in close contact and preventing them from slipping away from each other, like the slider of a parasol. At length the patient finds the strength of his limb restored, and conscious of the change, can no longer be persuaded to refrain from using it. After a certain period, which has been differently stated—perhaps six or seven months in the case of a large bone—the fractured ends become firmly adherent by the deposit of bony matter between them; the exterior case becomes absorbed, and the cure is complete, the bone being rather thicker and generally somewhat stronger and more solid in the situation of the fracture than before the accident. The whole of this process is much quicker in infants and children than in adults, and somewhat more slow in advanced periods of life than in the middle age. Taking all ages, it ranges, as we have said, from two to eight, or ten weeks—speaking, of course, of the period at which the limb becomes firm enough to perform its functions.

The treatment and progress of compound fracture depend upon the circumstances of each case; and it would lead us too far to enter upon them. The principles of management, however, are the same, as are likewise, in the main, the natural processes by which firm union is established.

Ununited Fracture.—It sometimes happens that, without any assignable cause, the processes we have just spoken of do not go forward; and the fracture, originally perhaps a very simple and promising one, either does not unite at all, or unites only by a tough and flexible substance like ligament or tendon; and this even where nothing faulty can be discovered in the constitution of the patient or in the management of the surgeon. Attempts are made to excite irritation and promote the deposition of bony matter in this new substance by rubbing the ends of the bone together and in other ways. Such attempts not unfrequently fail, and the bone remains flexible and useless for life.

Causes of Fracture.—We have said nothing of the various ways in which fractures may accidentally take place, because each reader can imagine them for himself. There are, however, some circumstances with reference to this subject which it is proper to mention. In the first place, the simple action of the muscles, without any blow or external pressure, is sufficient to break the bones. Such is, generally speaking, the case in transverse fractures of the *patella* or knee-pan, and occasionally in those of the *olecranon*, or point of the elbow. When these are broken off by a sudden jerk of the muscles attached to them, the detached portion of bone is carried up to some distance, and can rarely be brought into sufficiently close apposition to unite by bony matter. But the ligamentous substance we have mentioned in speaking of ununited fracture is formed between the broken surfaces; and if proper care be taken not to permit it to be stretched while it is yet soft and extensible, it answers every purpose in these cases nearly as well as bone. When one patella has been broken in this way, the other is almost sure to follow soon after, having a double duty to perform in supporting the muscular contraction by means of which the thigh is brought to a straight line with the leg in the erect posture.

Imperfect Fracture.—There are some conditions which modify the liability to the occurrence of fractures. Among these may be mentioned the soft and cartilaginous state of the bones in young infants before the earthy matter has been completely deposited. At this period it is not uncommon to find that although the limb is flexible at a certain point, no crepitation can be felt, and that in point of fact there is no actual separation of the ends of the bone. This is called *imperfect* fracture.

The opposite state of brittleness prevails in old age; and owing to this circumstance, a very slight accident will often cause a fracture of the neck of the thigh bone, the soft parts commonly receiving little injury. In these instances ligamentous union is sometimes all that can be effected, and the limb remains for the remainder of life to a great degree crippled.

Fragilitas Ossium.—A still more brittle condition of the bones is sometimes co-existent with cancer and probably other morbid states of the constitution. It is called *fragilitas ossium* (fragility of the bones), and sometimes reaches a remarkable pitch. A late eminent physician informed the writer that being called to attend upon a lady in her pew at church, he found she had broken her thigh in rising from her hassock; and in attempting to raise her, he broke both her arms. There is generally

little injury of the soft parts in these fractures, and they are said to unite rather more quickly than others.

Some persons have asserted that the bones are more brittle in winter than in summer; but it does not require an hypothesis so improbable as this to explain the principal fact on which the proof has been rested, namely, the more frequent occurrence of fractures in frosty weather.

FRACTURE, in mineralogy, means the irregular surface which appears when a mineral is broken, so that surfaces do not constitute a *cleavage*. The kinds of fracture are determined by the aspect and forms of the surface presented by the mineral. Werner divides the varieties of fracture into compact, fibrous, radiated, and foliated. The compact may be splintery, even, conchoidal, uneven, earthy, or hackly. The fibrous may be coarse or delicate, straight or curved, parallel or diverging; and the diverging again is either stellular, scopiform, or promiscuous. The radiated fracture is broad or narrow, straight or curved, diverging or promiscuous; and streaked or smooth.

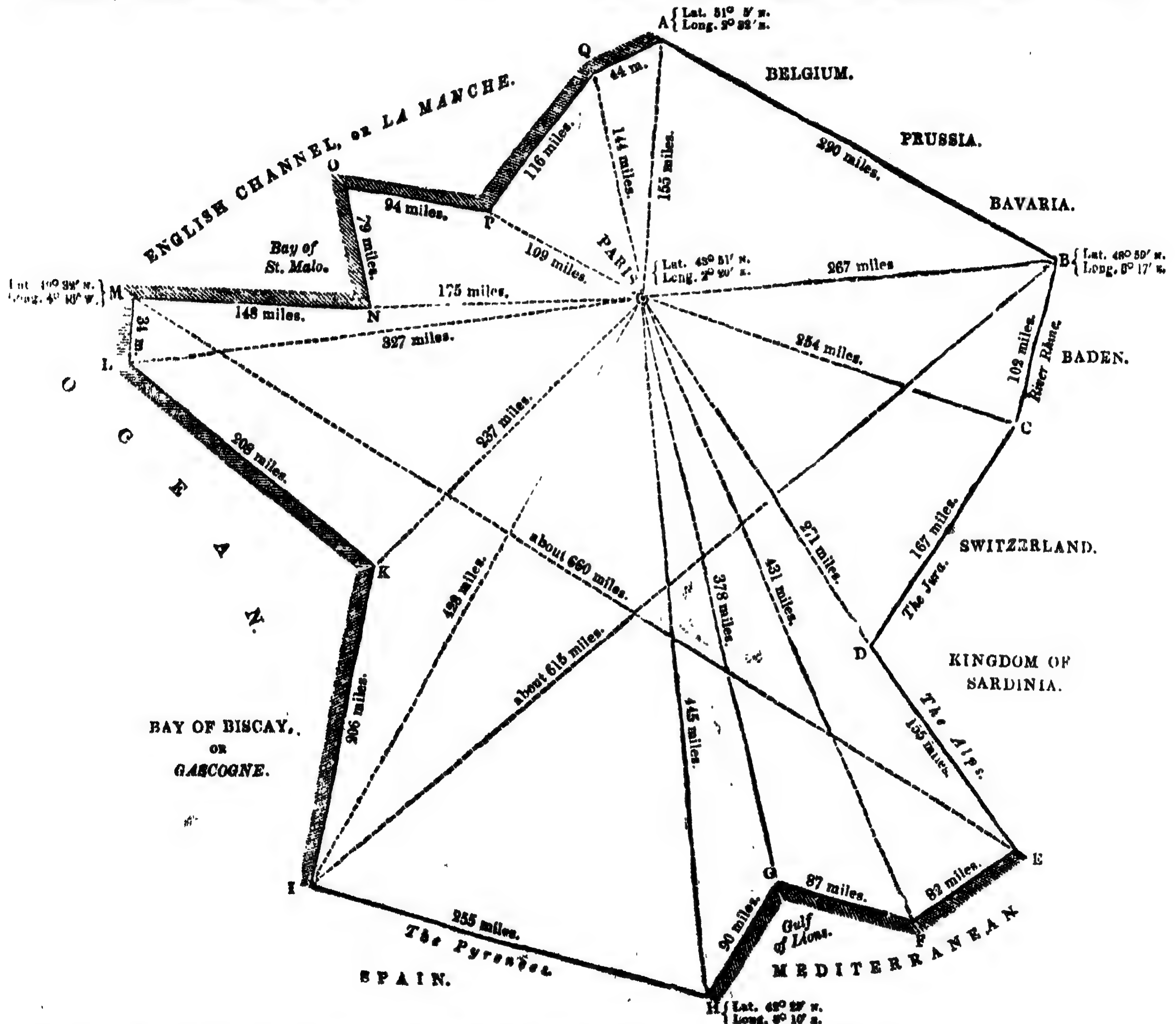
Other mineralogists do not employ so many descriptive terms as the above; thus, on looking through the description of minerals by Mr. Brooke, we find little else but the following varieties of fracture:—conchoidal, fine conchoidal; earthy, fine earthy; foliated; granular; indistinct, very indistinct; splintery, coarse splintery, and uneven.

FRAGA'RIA. [STRAWBERRY.]

FRAISE is a row of palisades placed in a horizontal or inclined position on the exterior of a rampart of earth, in order to increase the difficulty of passing over it at the time of an assault.

FRAMLINGHAM. [SUFFOLK.]

FRANCE, the most westerly of the kingdoms of continental Europe with the exception of the Spanish Peninsula. Its form is very compact, and resembles an irregular polygon, the general contour and dimensions of which, with the latitude and longitude of the extreme points, are given in the subjoined diagram. From this it appears that it is comprehended between 42° 25′ and 51° 5′ N. lat.



A, the frontier towards Belgium meets the coast.
B, the frontier towards Bavaria meets the Rhine.
C, the frontier towards Switzerland meets the Rhine.
D, junction of the Rhône and the Guiers.
E, mouth of the Var.
F, Cape Nôtre Dame, on the coast near Toulon.
G, mouth of the canal of Aigues Mortes.
H, the frontier towards Spain meets the Mediterranean.
I, the same frontier meets the ocean.
K, mouth of the Sèvre of Niort.
L, Bec du Raz.
M, on the coast north-west of Brest.
N, Mont St. Michel, in Cancale Bay.
O, Cape La Hogue.
P, Le Hâvre, at the mouth of the Seine.
Q, Cape Gris Nez, between Calais and Boulogne.

*** The measurements are from the map of France by A. H. Brué, in four sheets, Paris, 1818.

and 8° 17′ E. and 4° 46′ W. long.; that the aggregate length of the circumscribing lines of the polygon is 2157 miles, of which 1188 miles are coast (929 miles on the ocean and 259 on the Mediterranean) and 969 miles of land frontier. If all the less important windings of the coast or of the frontier were followed, these numbers would of course be materially increased. The longest diagonal is from south-east to north-west (E to M on our diagram), about 660 miles; and the next longest from north-east to south-west (B to I), about 615 miles.

The area of France may be computed at 26,766 square geographical leagues of 25 to a degree (=204,711 square English miles), including the island of Corse, or Corsica, which, though by its geographical position and antient political ties rather pertaining to Italy, is now incorporated with France, and forms one of its departments; or 26,271 square geographical leagues (=200,925 square miles) exclusive of that island. The population, by the last census, that of 1836, was 33,540,908 (164 to a square mile), inclusive of Corsica, or 33,333,019 (166 to a square mile) exclusive of that island. The number of inhabitants was greater than at the census last preceding, viz. that of 1831-2, by

979,974, being an increase in the population of about 8 per cent. Paris, the capital, is in 48° 51′ N. lat. and 2° 20′ E. long. from Greenwich; its population in 1836 was 909,126. It is the second European city in respect of population, being inferior only to London. The population of the metropolitan department of Seine, which comprehends Paris and its environs for six or eight miles all round, was 1,106,891.

Coast, Islands, and Frontier.—That part of the coast which faces the north-north-west (M to A in our diagram, 481 miles) lies along the channel which separates England from the continent, to which the French give the name of La Manche (the Sleeve). This coast is generally irregular in its outline. It forms two large bays, separated from each other by the peninsula of Cotentin, of which Cape La Hogue (O in diagram) forms the north-west extremity. Of these bays, that which is the most easterly is divided into two subordinate bays by the rounded projection of the coast about Fécamp and St. Valery. One of these subordinate bays receives the Somme, the other the Seine, at the mouth of which the town and port of Le Hâvre (P in diagram) are situated. This part of the coast is mostly low and shelving, lined in many parts with sand-hills, which prevent the tide from overflowing the lands which are below the level of the sea. About Cape Gris Nez there are cliffs, and west of the mouth of the Seine the shore is skirted by rocks. The peninsula of Cotentin has, besides Cape La Hogue, another considerable promontory to the north-east —Cape Barfleur. The coast of this peninsula is commonly shelving, interrupted, however, by groups of rocks. The bay of St. Malo, the second of those formed by the coast of the Manche, is a deep bay, the sides of which, facing respectively the west-by-south and the north, form an acute angle with each other in the neighbourhood of Mont St. Michel, in Cancale Bay. The coasts of the bay of St. Malo are rocky and much broken, especially to the west of Mont St. Michel, by a multitude of small inlets with their intervening promontories. No important river falls into this bay, but many of the inlets are the æstuaries of small streams. The remainder of the coast of the ocean faces the south-west and west, and extends 448 miles. At its north-western extremity (L to M in diagram) it is broken by a deep inlet, the subdivisions of which form the water of Brest and the bay of Douarneriez. The coast here is lofty and precipitous. From the Bec du Raz (L) the coast runs facing the south-west, and continues for some time to present the same general features as the adjacent part of the Channel coast—a broken outline, frequent inlets with intervening promontories, and a shelving coast interspersed with rocks. As it proceeds to the south-east of the mouth of the Loire (which falls into the ocean mid-way between K and L), it becomes less broken in its configuration, low, and lined with salt marshes. This character it retains to the mouth of the Gironde (a little to the southward of the point K), from which the coast follows a line nearly direct, broken only by one small inlet, the bay or basin of Arcachon, and is skirted by sandy downs to the foot of the Pyrenees (at I), near which the coast assumes a rocky and precipitous character. This coast forms one side of that bay known familiarly to us as the bay of Biscay, but designated by the French the bay of Gascogne.

The coast of the Mediterranean forms by its sinuosities the two great bays of Lions and Genoa, which are separated from each other by the projection of the coast about Toulon (F in diagram). The gulf of Lions (which, it may be observed, derives its name not from the city of Lyon or Lyons, but from the lion-like violence of the tempests by which it was supposed to be agitated—'It is called the Lion's Sea because it is ever rough, tempestuous, and destructive'*—) is characterized by the étangs or lagoons by which its coast is skirted; it receives the waters of the Rhône. This part of the coast is commonly low, but towards the foot of the Pyrenees (H in diagram) and near Toulon (F) it assumes a bolder character. The coast of the bay or gulf of Genoa, of which only a part belongs to France, is elevated and broken. It has many smaller inlets, as the harbour of Toulon, the road of Hières and that of Bormes, and the gulfs of Grimaud, Fréjus, Napoule, and Juan.

Along the coast are several islands. In the Manche or English Channel are Gernesey or Guernsey, Jersey, Aurigney or Alderney, and Gers or Sark, which, though belonging to France by geographical position, and connected with it by the language and origin of their population, are politically united to the British isles, and form indeed the sole relic of the once extensive Norman or other French possessions of the early English kings: the Islands of Brehat, les Sept Iles (the Seven Islands), and the Isle of Bas, are of minor importance. At the western extremity of France are the Isles of Ouessant or Ushant, and along the remainder of the coast of the ocean are the Isles of Glenan, Groaix, Belle-île, Noirmoutier, Ile-Dieu, Ré, Oleróon, and others of less importance. In the Mediterranean we have the Islands of Hières and Corse, or Corsica. All these are noticed either under their respective articles, or under those of the departments to which they belong: ALDERNEY, BAS, BELLE-ILE, CHARENTE INFERIEURE, CORSICA, COTES DU NORD, FINISTERE, GUERNSEY, JERSEY, MORBIHAN, VAR, VENDEE.

The land frontier of France is, for the most part, formed by great natural barriers. On the southern or Spanish frontier are the Pyrenees, along the crests of which from the Mediterranean to the ocean (H to I in diagram) the line of demarcation runs. On the south-east, the frontier towards the continental dominions of the king of Sardinia (from between C and D to E in diagram) is formed by the lofty ridges of the Alps; and that towards the Swiss Confederation (from C towards D) by the lower, but still considerable heights of the Jura. On the east the broad stream of the Rhine (B to C) separates France from the dominions of the grand-duke of Baden. The remaining part of the frontier (A to B) is purely conventional, and has varied materially in the last half century, as the fortune of war has enabled the French to extend or obliged them to contract their dominions. The conterminous states are Bavaria, Prussia, and Belgium.

Surface, geological character, hydrography.—The loftiest mountains in France are those on the Sardinian and Spanish frontiers, the Alps and Pyrenees. Of the Alps the loftiest summits lie beyond the boundary of France, in Savoy or Switzerland; but some of those on or within the line of the frontier are of great elevation: as Mont Olan, in the valley of Godemard, on the upper waters of the Drac, 13,819 feet; Pelvoux de Vallouise, south west of Briançon, 13,442; a peak west of the village of Maurin 13,107; Mont Trois Ellions 12,737, and others. Of the Pyrenees the highest point, Mont Maladetta, is in Spain, but other points which nearly equal it are in France or on the frontier, as Vignemale, at the head of the valley of Cauteretz, 11,001 feet; Peak, near the Cascade of Gavarnie, 10,745 feet; Montcalm 10,663; Peak of Estats 10,611, and several others of above 10,000 feet. The highest summits of the Jura belong to Switzerland; Le Mont d'Or, near Rochejean on the Doubs in France, has a height of 4797 feet, and Le Gros Taureau, near Pontarlier, 4351. [ALPS; PYRENEES.]

The Cévennes, of which the Montagnes Noires, or Black Mountains, of Languedoc and the mountains of Espinouse and the Garrigues are subdivisions, are separated from the Pyrenees by a valley, through which the great canal of Languedoc runs: they extend in a north-eastern direction, and after sending off branches to join the group of primitive and basaltic mountains of Auvergne, turn to the northward and skirt the valley of the Rhône and the Saône: in this part of their course they are known (according to the districts through which they pass) as the heights of Vivarais, Forez, Lyonnois, Beaujolois, or Charollois. Mont Mezen, the highest of Cévennes, is 5820 feet high, and Mont Gerbier de Jones, at the source of the Loire, 5125. The mountains of Auvergne rather surpass these in height. Le Pic de Sancy, the summit of Mont d'Or, is 6224 feet high, Le Puy Ferrand is 6116 feet, and Le Plomb de Cantal is nearly as high. There are several other 'Puys' or volcanic summits of inferior height.

The comparatively humble slopes of the Côte d'Or of Bourgogne (Burgundy) may be regarded as a continuation of the Charollois heights, and serve with the heights of Langres to connect the Cévennes with the Vosges, whose branches extend to the south-east so as to unite with the Jura, and whose wild and wooded steeps form the western boundary of the valley of the Rhine. The principal summits of the Vosges are Le Ballon de Sultz or Guebwiler, 4695 feet high, Le Haut d'Honnec, 4391 feet high, Les Chaumes, 4203 feet, and Le Ballon d'Alsace, 4124 feet.

* 'Mare Leonis nuncupatur quod semper asperum, fluctuosum, et crudele.' —*William of Nangis*, a monk of the thirteenth century, quoted by Malte Brun.

From the heights of Langres a range of high lands extends in a north-west direction to the coast of La Manche, about Cape Gris Nez, separating the streams which belong to the great system of the Rhine from those which belong to the river systems of central France. A branch from these heights divides the basins of the Seine and the Somme. From the Charollois heights a range of hills of gradually diminishing elevation extends to the neighbourhood of the Loire, separates that river from the streams which flow into the Seine, and connects the mountain system of Central France with the heights of Beauce, which are a prolongation of the Menez mountains of Bretagne. These run from the headlands near Brest in an eastward direction. A range which proceeds in a north-west direction from the central group of the Auvergnat mountains toward the mouth of the Loire, called the heights of Gâtine, separates the basin of the Loire from that of the Garonne; and another range, which branches off from the Pyrenees near the Pic du Midi, and runs north-west till it subsides in the Landes (heaths) of Bordeaux, separates the basins of the Garonne and the Adour.

The Cévennes, the heights of Langres, and the range proceeding from the latter to the coast of the Channel, separate the western or oceanic slope (*versant Océanique* of Malte Brun) from the eastern; the latter is subdivided by the heights which connect those of Langres with the Vosges and by those branches of the Vosges which unite with the Jura, into the north-eastern or Rhenish slope (*versant Rhenan*), and the south-eastern or Mediterranean slope (*versant Mediterranéen*).

The western slope includes the basins of the Adour, the Garonne, the Charente, the Loire, the Vilaine, the Orne, the Seine, the Somme, and a number of others of less importance. The basin of the Adour is bounded by the Pyrenees and the range which extends from these to the mouth of the Garonne: the length of this river is about 194 miles. The basin of the Garonne is bounded by the heights last mentioned, by the Pyrenees, the Cévennes, the mountain group of Auvergne, the heights of Gâtine, and a small branch from these which divides the basins of the Garonne and Charente. The general course of the Garonne is to the north-west; that of its principal tributaries which flow from the Cévennes and the Auvergnat group (as the Dordogne, the Lot, and the Tarn) is to the west; that of the Pyrenean tributaries, which are smaller, to the north; the Dordogne is the last tributary of importance which it receives in its course to the ocean; and their joint æstuary is called the Gironde, a name which like that of our own Humber applies to the æstuary alone. The basin of the Garonne is inferior in extent to that of the Loire, but exceeds that of the Seine in the proportion of 7 to 6. The length of the principal streams of the system of the Garonne is thus given by Malte Brun: the Garonne itself 360 miles, the Dordogne 293 miles, the Lot 166 miles, and the Tarn 207 miles. The basin of the Charente is bounded by the heights of Gâtine or their branches, and the length of the river is 235 miles or thereabout. The basin of the Loire, the largest river that wholly belongs to France, is bounded by the heights of Gâtine, the Auvergnat group, the Cévennes in which it rises, the Charollois heights, the heights which connect these with the heights of Beauce, the heights of Beauce, and the Menez mountains of Bretagne. The direction of a line drawn from the source of the Loire to its mouth would be north-west, and it would lie nearly along the ridge of the heights of Gâtine, but from the great bend which the river makes, its course is first north and then west; its principal tributary, the Allier, has a northward course nearly parallel to and not far distant from the upper part of the Loire: the Cher, the Indre, and the Vienne, have a north-west course. These all join the Loire on the left bank; the most important tributary which it receives on the right bank is the Mayenne. The length of the Loire is given by Malte Brun at above 600 miles; that of the Allier at about 250; that of the Cher, 215; that of the Vienne, 207; and that of the Creuse, an affluent of the Vienne, 166 miles. The basin of the Vilaine is bounded on the north by the Menez mountains, and on the east by a branch of the same mountains which separates the basin of the Vilaine from the basin of the Loire; the length of the Vilaine is about 124 miles. The basin of the Orne is bounded by the Menez mountains, or their branches; the length of the river is above 82 miles. The basin of the Seine is bounded by the heights of Beauce and those of Langres with their connecting range; and by the hills which branch off from the heights of Langres toward the Channel. The length of the Seine is given by Malte Brun at 470 miles; that of its principal tributary, the Marne, is 268 miles. The basin of the Somme is bounded by the heights that run from those of Langres to the coast of the Channel; the length of the river is about 110 miles.

The north-eastern or Rhenish slope comprehends parts of the basins of the Escaut or Schelde, the Meuse or Maes, the Moselle, and the Rhine. Only a comparatively small part of the course of each of these rivers belongs to France; no part of the course of the Rhine is indeed included in that country, of which it only forms the boundary.

The Mediterranean slope comprehends the basin of the Rhône, and of one or two other streams, which are too small to require notice. The basin of the Rhône is bounded by the Cévennes, the heights of Charollois, the Côte d'Or, the heights of Langres, the Vosges, the Jura, and the Alps: its greatest extension is from north to south, and it is comprehended partly in Switzerland and the Sardinian states, but chiefly in France. The course of the Rhône in Savoy, Switzerland, and part of France is nearly west; at the great city of Lyon it bends to the southward: its whole course is about 525 miles; that of the Saône, its principal affluent, is 304 miles; that of the Isère and the Durance, two other affluents, about 190 and 220 respectively; and that of the Doubs, a feeder of the Saône, about 250.

General Geological Character.—Of the geology of France our limits and our materials restrict us to a general and rapid sketch. The sands, clays, limestones of later formation, marls, and sandstones, which constitute the strata above the chalk (including the alluvial and diluvial beds), and may be designated the 'super-cretaceous group,' occupy several extensive districts. 1. The largest of these districts is in the south-west of France; it extends from a line drawn along the foot of the Pyrenees from the ocean to the Mediterranean, northward to a line drawn from the mouth of the Gironde below Blaye to the Etang de Sigéan, near Narbonne. It comprehends nearly the whole of the valleys of the Adour and the Garonne, with the intervening 'landes,' or heaths; the lower part of the valleys of the Dordogne, the Lot, the Tarn, the Arriège, and the other streams which join the Garonne on the right bank; the whole of the valleys of those streams which join it on the left bank, except such as have their sources in the higher part of the Pyrenees; and a narrow belt from the valley of the Garonne to the Mediterranean, along the coast of which, beds of this formation, probably alluvial, extend to the border of Spain. 2. The next district in extent is what is designated 'the Paris basin,' extending for several miles in every direction round that city, bounded by an irregular line drawn from the neighbourhood of Gisors, on the north-west of Paris, to La Fère on the Oise; from thence to the neighbourhood of Epernay on the Marne; from Epernay to the Seine, at the junction of the Loing, and along the valley through which the canals of the Loing and of Briare have been cut, to the valley of the Loire; along which valley these formations extend upwards to Cosne, and downwards below Blois: from this last point they are bounded by a line drawn northward to the neighbourhood of Gisors. 3. The third district extends along the valley of the Saône on the east side of that river from the junction of the Doubs to Lyon, and then along the east side of the valley of the Rhône to below the junction of the Drôme: this long strip has a breadth of several miles on the east side of the Saône and Rhône, but does not extend to the west of those rivers, except between the junction of the Doubs and the Canal du Centre with the Saône. 4. The next district comprehends the alluvial formation of the delta of the Rhône, and the lower part of the valley of that river, and of its tributaries the Aigues, Ouvèze, and Durance. 5, 6, 7. There are three other narrow portions occupied by these later formations, extending along that part of the valley of the Rhine which belongs to France; along the valley of the Allier, from near Brioude to below Moulins; and along the valley of the Loire from near Feurs to the junction of the Avron. 8. That small part of France which lies to the north of a line drawn from Calais by St. Omer to the Belgian frontier, is occupied by those formations which extend into Belgium, and occupy a large part of that country.

The chalk formation skirts the district occupied by the super-cretaceous group on the north-east side alone, extending from the coast between the Gironde and the Charente to the river Lot, southward of which it is not found: the breadth of this belt of chalk is tolerably uniform; about 25 or 30 miles. The Paris basin is surrounded on almost every side by the chalk which forms a circular belt of very variable breadth, from 24 or 25 miles (from Reims to Rethel), to more than 100 (from Clermont, near the Oise, to the coast near Calais): the continuity of this belt is only interrupted by the extension of the super-cretaceous strata up the valley of the Loire toward Cosne. The chalk formation occupies the coast of the Channel from Cape Grisnez, a little to the south-west of Calais, to the west of the mouth of the Seine, except near Boulogne, where it is interrupted for a short interval by the strata of the formations below it, which here rise to the surface. This chalk formation is opposite to that of the south-east of England (Kent and Sussex), a section of which occupies part of the seacoast of these two counties.

The group which comprehends the oolitic and other formations, from the chalk marl (which underlies the chalk) to the lias, surrounds the chalk belt of the Paris basin on the west, south, and east sides. On the west side the district occupied by these formations is narrow, except just on the coast of the Channel, along which it extends from near the mouth of the Seine to the peninsula of Cotentin. On the south-west it becomes wider, and extends to the chalk belt which bounds on the north-east the 1st super-cretaceous district: along this belt it extends, forming an outer belt from the ocean, to the river Lot; and from the Lot it extends towards the south-east, skirting the super-cretaceous district. Along the south side of the chalk of the Paris basin, these under-lying strata have a variable breadth: on the south-east and east they extend, interrupted only by the more antient strata of the Vosges, to the valley of the Rhine and the upper waters of the Saône, and across that river to the Jura, the heights of which consist of these formations. From the Saône and the Jura these formations extend southward to the Mediterranean, bounding the 3rd super-cretaceous district on the east, and then, extending westward across the Rhône, enclose the 4th super-cretaceous district between their branches. A belt of these strata extends, with one or two interruptions, along the foot of the Pyrenees on the south of the great or 1st super-cretaceous district, from the ocean nearly to the Mediterranean.

The new red sandstone or red marl, and the magnesian limestone which underlies it, formations which in England spread over a great extent of country, occupy only a small part of France: they are found in the Vosges, the Cévennes, and one or two other places.

The coal-measures, the slates, and the granites and other primitive rocks, occupy several extensive districts. 1. The whole of Bretagne and the adjacent part of Normandie, and the other conterminous provinces in the west. 2. The mountain district of Auvergne, part of the Cévennes, the hills of Vivarais, Forez, and the Charollois, and a large extent of country west of Auvergne, as far as the banks of the Vienne and the sources of the Charente: this district is intersected by the 6th and 7th super-cretaceous districts; and here the oldest and the latest formations may be found in juxtaposition, without the intervention of any of the intermediate strata. 3. The Alps. 4. The Pyrenees, in which calcareous formations abound, and organic remains are found at a vast height. 5. The Vosges, where they are not occupied by the new red sandstone or magnesian limestone, by which formations the primitive district is nearly surrounded. 6. A considerable insulated district in the southern part of the Cévennes, between districts 2 and 4. 7. A small tract in the northern part of France, between the Sambre and the Meuse.

The great primitive district of central France (the 2nd in our enumeration) abounds in extinct volcanos; and in the rocks, such as trachytes, basalt, lava, &c., which have arisen from them. Several of the 'Puys' of Auvergne consist of the craters of these volcanos, resting on the granite, which is the prevailing rock of the district, and other crystalline rocks. [AUVERGNE.] The Cévennes and the valley of the Rhône (even in those parts occupied by the strata between the chalk and the primitive rocks) exhibit traces of volcanic agency, as likewise the isolated primitive district between Auvergne and the Pyrenees. Others are observed in the antient Provence, near the sources of the Argens, and one or two in the north-east of France.

The island of Corsica consists chiefly of granite and other primitive rocks, bounded on the east and west by sandstone which form the coast, and on the south by the later, or super-cretaceous formations, which occupy the neighbourhood of Bonifacio. (*Geological Map in the Atlas to* Malte Brun's *Géographie Universelle.*)

The mineral riches of France are considerable. Granite, sienite, porphyry, variolites, and serpentine are quarried in the department of Hautes Alpes (High Alps), in Corsica, and in some of the departments of the north-west; lava in Auvergne, and marble of great variety and beauty in the Pyrenees, in Corsica, and in various other parts. Vast slate quarries are wrought at the foot of the Pyrenees and in the department of Maine et Loire, as well as in some parts of the east of France, near the Belgian frontier; and excellent limestone quarries for building are wrought in different departments of the centre, east, north-east, and north, and in that of Hérault in the south. Good stone, adapted for the purpose of lithography, is also found. The departments of the north-east, into which the former provinces of Champagne, Bourgogne, Flandre, and the Ile de France have been divided, furnish the best clay for bricks and tiles; the department of Haute Vienne (part of the antient Limousin) the best kaolin or fine clay for porcelain; that of Seine Inférieure (antient Normandie) the best pipeclay; and the neighbourhood of Paris abundance of excellent gypsum. The departments of Seine, Seine et Oise, Seine et Marne, and Oise yield chalk, sandstone for paving, and millstones. Of the metals, iron is the most plentiful; of the oxide of manganese there is a quantity sufficient to supply all Europe; of antimony there is a great quantity; and of lead, which is combined with silver, there is a great abundance, especially in the departments of Finistère, Isère, Lozère, and Vosges. Silver, uncombined with any other metal, is found in the department of Isère. Some copper-mines are wrought, the most important in the neighbourhood of Lyon. Gold is found in the soil brought down by some of the streams which rise in the Pyrenees and the Cévennes, by the Rhône and by the Rhine. A gold-mine in the department of Isère, though now abandoned, might, it is supposed, be wrought with advantage.

No less than thirty-three of the departments contain coal-pits, and some, especially Bouches du Rhone, Isère, Mayenne, Sarthe, and Bas Rhin, produce lignite, or fossil wood, and anthracite; sulphate of iron, alum, asphaltum, bitumen, and petroleum, are also found. The most productive coal-districts are near Valenciennes in the north, and St. Etienne in the south of France. The mines near Valenciennes are not so numerous as those round St. Etienne, but are wrought on a much larger scale, and produce a more valuable coal. Much coal is dug in the departments of Saône et Loire, Aveyron, and Gard. The department of Meurthe contains brine-springs and rock-salt. There are in France two hundred and forty mineral springs, of which more than one hundred and fifty are collected in baths for the reception of patients; the others are taken internally, and are frequented, the greater part by visitors from a distance, the others by persons in the neighbourhood.

Climate.—It appears from observations which have been made, that the northern and western parts of France are drier than the southern and eastern. In the department of Isère, the mean annual quantity of rain is 32 inches; in the mountainous part of Haut Rhin 30 inches (French measure); in the plains of the same department more than 28 inches; and in the department of Rhône (Lyon) above 29 inches: while in the department of Ille et Vilaine it is only 21 inches; in those of Orne and Eure, between 20 and 21; and at Paris, in the department of Seine, between 19 and 20 inches. Of the difference and the variations of temperature in different parts of France, a judgment may be formed from the following table, some of the statements of which are however to be regarded as approximations to the truth rather than as of ascertained exactness:—

Place.	Average Temperature. Summer.	Winter.	Place.	Average Temperature. Summer.	Winter.
Clermont in Auvergne	64·4°	34·5°	Bordeaux	70·9	42·1
			Marseille	72·5	45·5
Dunkerque	64·	38·7	Montpellier	75·4	44·1
Paris	64·6	38·7	Toulon	75·0	48·4
St. Malo	66·°	42·1°	Nîmes	73·4	48·2
Nantes	68·5	40·5	Agen	83·7	36·5

We give the table from the last edition of Malte Brün's *Géographie Universelle*, substituting Fahrenheit's scale for the Centigrade.

Agriculture.—France has always been considered one of the most agricultural countries in Europe; and if the husbandry of France is not superior to that of other countries, it is not for want of writings on this important subject: the French authors on agriculture have collected all the information which has been handed down from the antients, or which experience has taught the moderns. But this has had little influence on the practice of the great mass of the cultivators of the soil, who are too ignorant to read books, and who, if they could read them, would seldom adopt methods not sanctioned by the usage of their forefathers. The want of ready communication by roads and canals must ever prevent any great exertions being made to increase the produce of the soil, beyond the immediate demand of the neighbourhood. One part of France has often had a deficiency of corn approaching to a famine, when plenty reigned in another. Even now (1837) the price of grain in the south of France varies so much from that in the north, that there is a difference in the duty paid on the importation of foreign corn in different ports; whereas in Great Britain the price is brought so nearly to a level everywhere, that the only difference arises from the expense of carriage by water, which is always inconsiderable.

In traversing France from north to south, and from east to west, the traveller, who expects to find an improved state of agriculture, is much disappointed. Arthur Young, in his tour through France in 1787, was surprised to find the state of cultivation so low in every province, except those bordering on the Netherlands. His observations have been acknowledged to be just by the French agricultural writers themselves, and a certain spirit of improvement has been excited by his remarks. Since the Revolution in 1793, every encouragement to agriculture has been held out by the government; but notwithstanding the numerous excellent publications which have been produced, and the establishment of agricultural schools, and model farms, the progress towards a more general adoption of improved methods of cultivation is very slow. In most parts of France the farmer still resides in or near the village, and the land which he cultivates is dispersed over a considerable extent of distant uninclosed fields. He loses much time in going and returning, and he has a great way to carry the little manure which he makes. Although the use of manure is fully appreciated, there is little knowledge of the means by which it may be increased. Artificial grasses are cultivated to a considerable extent, especially in the southern provinces, but not sufficiently to maintain as much stock as would produce the requisite quantity of manure; and the very small demand for animal food, at a distance from the large towns, gives little encouragement to the feeding and fattening of cattle, except where natural meadows abound, which is only along the course of the rivers, and in the provinces of Normandy and Brittany.

The great division of property which arises from the law of equal distribution among all the children at the death of the parent, tends much to lessen the size of farms. In a country where there are domestic manufactures to give employment to the labourer or peasant, when his plot of ground does not require all his time, a more careful cultivation is the consequence of small occupations. Habits of constant employment excite industry; and the ingenuity is sharpened by the practice of the mechanical arts. But in an ignorant peasant leisure produces idleness; and if a mere sufficiency of food can be procured from a small possession, for which no rent is paid, it is seldom that a great surplus is raised.

The proportion of the population of France, which is occupied in agriculture, is much greater than in those countries which are chiefly engaged in manufactures and commerce; and yet the inhabitants of the latter are in general better fed not in consequence of the importation of grain, but of a better cultivation of the soil, as is the case in Belgium. If Holland imports much corn, it exports in return butter, cheese, and cattle. Great Britain and Ireland have required little assistance from foreign countries of late years, although the population has greatly increased.

There are in France very few large proprietors of land, who, like the English country gentlemen, spend a great part of their time in the country, and take an interest in agricultural pursuits. There are not many speculative farmers who have capital, and are possessed of a superior practical, as well as a theoretical knowledge of agriculture, and who make it a means of acquiring wealth. Few expensive instruments can consequently ever be tried, or brought into general use, nor any extensive improvements undertaken. All these causes concur in preventing a rapid improvement in French agriculture.

The northern part of France, on the confines of Belgium, and in the immediate neighbourhood of Paris, are the best cultivated. In most other parts, except where the maize is cultivated, the old system of two or three crops of corn, and a fallow, is generally adopted. If the fallows were well worked and clean, the crops would be better; but this is by no means the case. The variegated appearance of the corn in May, from the abundant blossoms of weeds, proves that they have not been extirpated. When they appear likely to choke the corn, they are sometimes weeded out; but as the method of sowing the seed in rows or drills with an instrument is unknown or undervalued, there is no possibility of hoeing the intervals between the growing plants, and all the weeding must be effected with the hand.

The best account we have in English of the state of French agriculture is contained in the journal published by Arthur Young, of his journeys through France in 1786-7-8; and although some improvements have been introduced since the Revolution of 1793, and several Englishmen have purchased farms in various parts of France, where they have introduced a better husbandry, the present state is not very different from what Arthur Young represents it to have been half a century ago. He very properly divides the whole of France into four distinct climates as regards agriculture. In the northern the vine does not thrive so as to make good wine. This district lies north-west of a line which passes near Paris, and is parallel to the line of the French coast on the Channel; that is, in a direction nearly east-north-east and west-south-west, so that it advances more to the north on the eastern part, and less so on the western. The next division is that in which wine is made, but the maize or Indian corn does not thrive. The boundary of this district to the south is nearly parallel to the line first mentioned, and passing through Nancy in Lorraine divides France nearly into two equal parts. The third division is that in which both maize and wine abound, but where the climate is still too severe for the olive or the white mulberry; this is bounded on the south-east by the Jura and a line passing to the north of Lyon. The last division consists of the southern provinces from the last-mentioned line to the Pyrenees, where the olive and the mulberry abound, as well as maize and the vine. In this part the year often yields two harvests of corn, but the soil is not well adapted to permanent pastures, except at a considerable elevation above the sea.

The finest climate is in the third division, where corn, maize, and wine are good and abundant. The heat is not so oppressive as in the southern provinces; and there is the greatest scope for agricultural operations. The most fertile lands are towards the north and east. The Beauce immediately south of Paris is a fine country, and so are Touraine, Alsace, and the plain of the Garonne. The worst soils are in Champagne, Sologne, and along the coast of the Bay of Biscay. Arthur Young gives the following distribution of the land and its productions:—The whole surface of France he takes at 131 millions of acres, of which 70 are arable, 5 are taken up by vineyards, 20 covered with wood, 4 in meadows and good pastures, 5 in artificial grasses (which may be added to the arable part), and 27 in wastes, heaths, and poor pastures. These quantities were only an approximation; but they serve to show the small proportion of permanent grass land in France, the greater part of which is in Normandie and Bretagne.

The arable land of France is now estimated at 23,000,000 of hectares, which (taking the hectare = 2·47 acres nearly) are about equal to 56,810,000 acres English measure. The yearly agricultural produce of France is given by Malte Brun as follows:—

Wheat	[illegible] hectolitres	= about	[illegible] quarters.
Rye	[illegible]	" "	[illegible] "
Meslin, or mixed corn	[illegible]	" "	[illegible] "
Maize	[illegible]	" "	[illegible] "
Buck-wheat	8,400,000	" "	[illegible] "
Oats	32,000,000	" "	[illegible] "
Potatoes	20,000,000	" "	[illegible] "

We have given the equivalent quantities in English measures in round numbers (taking the quarter = 2·91 hectolitres nearly).

The quantity of grain produced in France now, very little exceeds what was grown fifty years since, although the population has advanced in the interval from 25,000,000 to 32,000,000. The cultivation of the vine, of the artificial grasses, of pulse, and, above all, of potatoes, has however much increased. Beet-root is extensively grown for the manufacture of sugar. The esculent roots and table vegetables are common. Flax and hemp are cultivated in various parts of the country, and to a considerable extent; the hop, tobacco, and madder, in a small degree; and the colza and rape, for oil, is grown in the north. The industry of the peasants in some of the more sterile districts is very great: in the Cévennes and in Auvergne they build walls to retain the alluvial soil brought down by the mountain streams, and cultivate the sides of the mountains by means of the terraces thus formed.

In the south the soil of the hills is stony, which suits the vine, but is unfit for the growth of corn; between the hills there are valleys which abound in every kind of produce; and where there is a command of water to irrigate the fields the most productive water-meadows may be made. But there are many spots quite unproductive for want of improvement. Wherever the maize is cultivated, it is sown every second year alternately with wheat. This succession cannot fail to exhaust the soil, however good it may have been at first; for maize returns little to the ground in the way of manure, and the straw of the wheat is not sufficient for that purpose. The French-bean is likewise cultivated for its seeds, which, when boiled, are said to contain more nutritive matter than any other seed, in the same compass. These crops cannot be raised to any extent without much manure; and the number of cattle kept is not sufficient to produce an adequate supply of it. The arable land and pastures are not intermixed as in England, but generally lie wide of each other. The horses and cows are fed chiefly on clover, lucern, saintfoin, and other artificial grasses, of which no greater extent is raised than is absolutely necessary. The keeping of more beasts than are immediately required to cultivate the land, for the sake of their manure, is a thing of which the generality of French peasants have no idea, at least in the central part of France. The consequence appears in the average produce of land which has every advantage of soil and climate. The increase of five or six measures of wheat for each measure sown is the full average of production: of barley and oats it may be somewhat more. The mode of valuing a crop by a comparison with the quantity sown is very fallacious: the produce per acre is a better criterion of the goodness of the soil, or the skill of the husbandman. Wherever agriculture is imperfect, more seed is sown than would be necessary with better tillage and manuring. In France the produce of an acre of wheat on good land may be averaged at 15 to 20 bushels, of barley 20 to 25, and of oats 25 to 30, or about one-third less than on similar lands in England, and not much more than half the produce of good land in Scotland, where the climate is much inferior. This is owing to the imperfect manner in which the land is usually worked, cleaned, and manured, and particularly to the deficiency of cattle. In the northern districts of France, where they have the example of Flemish industry, a better system is adopted: but it is astonishing to see the rapid decrease of good cultivation in travelling from Lille to Paris, and still more from Paris to Dijon and the Jura.

The agricultural implements in use in France are few, and not of an improved kind. Each province has its own fashion in making ploughs, most of which are rude and do their work imperfectly. A plough, called a *binot*, with a double mouldboard, is used in several districts, and is useful in stirring fallows; but when no other plough is used the whole soil is not moved, but the land is merely scored, and the roots of perennial weeds are not destroyed. The heavy turn wrest plough is used in other districts, chiefly in the northern part, and in heavy soils. The hack, or heavy hoe, is very generally used in those provinces where the maize is cultivated: the ground is ploughed in rough ridges, and pulverised by means of the hack: both men and women labour with this instrument; they go in rows, each taking a furrow, and digging up the earth turned over by the plough, reduce it to a proper degree of fineness. If this were well done, and the plough had gone deep, it would be an excellent cultivation, but the soil is only stirred four or five inches deep, and the weeds are not exterminated. Instead of harrows they use a board called a *traineau*, on which a man stands, while it is drawn over the land by a horse or ox: this levels the surface and covers the seed. The corn is reaped with the sickle, chiefly by women. In the northern parts the barns are very large, to hold the whole crop of the farm; for stacking corn, or even hay, is almost unknown. In the south the corn is thrashed out in the field, and put into granaries immediately after harvest. The size of farms in France is much less than the average of English farms; and the multitude of small occupations, by which a family is barely enabled to exist, is astonishing.

Model farms and establishments for the diffusion of agricultural knowledge have been established in various parts of France. That of Roville, under M. de Dombasle, has been long celebrated by the publication of the 'Annales de Roville.' At Grignon, near Paris, is an agricultural establishment supported by the government; and in several of the provinces similar establishments have been founded of late years. They cannot fail gradually to introduce improved methods of cultivation, and to bring France to its proper place amongst agricultural nations.

The vine is one of the most important objects of cultivation in France. In 10 of the 86 departments it is not grown for the purpose of making wine, or at all upon a considerable scale: in the other departments it is more or less an object of attention. The amount of land occupied by this culture is estimated at rather more than 2,000,000 of hectares, or 5,000,000 of English acres. The average yearly produce of the French vineyards is estimated at 42,000,000 hectolitres (about 924,000,000 gallons), of which, about one-sixth is converted into brandy. The former provinces of Champagne, Bourgogne (Burgundy), Lyonnois, Dauphiné, and the Bordelais, from which last district the clarets come, produce the finest growths. The banks of the Charente and the neighbouring districts produce the best (viz., the Cognac) brandy. The wines of Languedoc, Provence, and Roussillon are remarkable for fulness of body; but they want the fine odour (bouquet) of the first class of wines. The annual produce of the vineyards is estimated at 720,000,000 of francs, or about 28,500,000*l.*: of this quantity the exports amount to about 65,000,000 francs, or 2,700,000*l.* The rest is consumed in the country. In the departments of the north and north-west, which do not produce the vine, cider forms the usual drink of the poorer classes.

Of the fruits which are cultivated on a considerable scale in France, the mulberry is one of the most important: it is reared for the nourishment of the silk-worm. This branch of culture has much increased of late years. The olive, the orange, the lemon, the pistachio, are grown along the shore of the Mediterranean, but are not equal to those of other lands: the plum when dried furnishes a considerable article of export. The apple and the pear are grown in Normandie and Bretagne for making cider and perry, which furnish the peasantry with their common drink: the apple is also exported in a dried state. The chestnut furnishes the peasantry of the more barren districts with an important article of food, and the walnut is grown for the oil which is expressed from the fruit.

Of forest trees France has the oak, the cork-tree (*quercus suber*), which is cultivated in the departments of the south-west, the elm, the ash, the beech, the birch, the poplar (white and black), the larch, the juniper, the wild cherry, and the pine. The box, the cornel, the maple, and others furnish the cabinet-maker with ornamental wood. The eastern part of central France is the best wooded district, and the former province of Bretagne is the most destitute of wood. As in France wood is almost universally used for fuel, it is an object of considerable attention; and it is calculated that about one-seventh of the whole country is occupied as wood-land. The principal forests are on the various mountain ranges: except on the Alps and Pyrenees, which are rather bare of wood. The ranges of the Jura and the Vosges furnish good deals, which are often substituted for those of the northern countries of Europe; and the forests of the maritime pine enable the peasant of the Landes, or heaths, between the Garonne and the Adour, to turn that else barren tract to some account: these forests yield charcoal, rosin, and pitch.

Animals.—The domesticated animals of France are, for the most part, similar to those of Great Britain.

Horses in France are by no means equal either in num-

ber or in excellence to what they might be under a better system of agriculture. A considerable number are imported annually: although the richness of the soil should rather enable the natives to export. Considerable pains have been taken by the establishment of government studs and by other means to improve and increase the breed. The horses of the departments of the north and north-east, Somme, Pas de Calais, Ardennes, Haut Rhin, and Bas Rhin are well adapted for war, posting, and agriculture: those of the departments of Orne and Calvados are excellent for the saddle or the carriage: those of the departments of Maine et Loire, and Sarthe, and the departments adjacent to the mountain-chains of the Alps and the Jura, are adapted for the light cavalry: the horses of the former provinces of Limousin and Auvergne (known as *the Limousin breed*), and those of the former Guienne, Gascogne, and Béarn (called *Navarrins*), are in the highest repute for the combination of lightness and strength. The horses of Corsica and Bretagne are a rough hardy breed.

The ass, though probably superior to that of Great Britain, is, except in the department of Vienne, far inferior to the ass of Spain or Italy. Mules are bred in many parts, and some of them are exported. Oxen in France are much employed in the labour of the field instead of horses: they are of 12 or 15 different breeds; among the largest are those of the departments of Seine et Marne, Aisne, Haut Rhin, Pas de Calais, Charente Inférieure, Deux Sèvres, Lot et Garonne, and Gironde: among the smallest are those of Bretagne, and part of Orléanois, and the mountain cattle of the Alps, Pyrenees, Cévennes, and Corsica. Oxen are frequently bred in one part of the country and fattened in another part. The rich plains of Lower Normandie afford pasturage to great numbers of oxen which are brought thither from various quarters, especially from the hilly districts of central France where they are bred. The sheep are of various breeds, some of which have been so far improved as to furnish a wool equal to that of Saxony. The number of sheep in proportion to the population is by no means equal in France to what it is in England; they are most numerous in the former provinces of Berri, Bourbonnois, Normandie, Picardie, Ile de France, Orléanois, Rouerque in Guienne, and part of Languedoc. The sheep of Poitou and Picardie, and of some parts of Normandie, the Isle de France, and Guienne, are the fattest; those of Bourgogne and the Ardennes are most esteemed for their mutton: but the best on the whole are those reared on the sandy districts near the sea. The sheep of Roussillon approach nearest to the Merinoes in the fineness of the fleece. Some goats are bred in the former province of Berri, in the mountainous districts of Auvergne, the Cévennes, the Vosges, and the heights which connect these two chains, in the Pyrenees, the Alps, in the Landes of Guienne and Gascogne, and especially in Corsica: the Thibet goat, whose hair is woven into the Cachemire shawls, has been naturalized in the Pyrenees. The swine are of three races: the original breed, which existed in the time of the Celts, and which is still found in Normandie, especially in the valley of Auge; the Poictevin breed, and that of Perigord: from the crossing of these breeds a number of varieties have resulted. The trade in salt provisions forms an important branch of industry in the department of Basses Pyrénées (where the Bayonne hams are cured), and in the frontier departments of the east and north-east. The number of horses in France is estimated at 2,500,000. The number of oxen in 1830 was ascertained to be 7,130,632: they were most numerous in the departments of the north-west, comprehending the western part of Normandie, and the whole of Anjou and Bretagne. The number of sheep at the same period was 29,130,231, and of goats 1,206,093.

The rearing of poultry is in some parts much attended to. The cock and hen of the peninsula of Caux constitute a peculiar race, which are fattened in the environs of Barbésieux, La Flèche, and especially Mans: the goose is reared in the former provinces of Languedoc and Alsace, and in several places in the west of France: and the duck in Lower Normandie and Languedoc. By a peculiar mode of treatment the livers of the duck and goose are rendered very large and very delicate. The duck's-liver pies of Toulouse and the goose-liver pies of Strasbourg are known to epicures.

Of wild animals there are some which are not found in England. The black and brown bear have their haunts in the French Pyrenees; the lynx is found, though very rarely, in the recesses of the higher Alps; and the wolf and the wild boar are common in the forests of any extent. The chamois and the wild goat are found on the summits of the Alps and Pyrenees. The stag, the roebuck, the hare, and the rabbit are common. The marmot inhabits the Alps and the Pyrenees, and the ermine and the hamster are found in the neighbourhood of the Vosges.

The red squirrel, the alpine squirrel, and a species of the flying squirrel are also found in the forests of the Vosges and in the woods on the banks of the Moselle or on the slopes of the higher Alps. The smaller beasts of prey and vermin, such as the fox, the badger, the hedgehog, the polecat, the weazel, the rat (of which the original black species has been, as with us, exterminated and replaced by the invasion, a century since, of a larger kind), the mouse, the mole, and the field-mouse are sufficiently numerous in their respective haunts. Among the amphibious animals are the otter and the water-rat; the beaver is occasionally found on the banks of the Rhône [BEAVER, p. 124]; and the 'desman,' an aquatic animal little known, is sometimes seen in the neighbourhood of Tarbes.

Of birds the chief songsters and the birds of passage are much the same as in England, with the addition of the hoopoe and one or two others.

The flamingo is found on the shores of the Mediterranean. Of game, there are the red partridge, common in the departments of the centre and west, and the grey partridge, common in the south; the quail, the ortolan, the beccafico, the pheasant, the woodcock, abundant in Picardie, and the snipe in Auvergne. The plover, lapwing, wild duck, and others are taken in great numbers on the coasts of the Channel and the Ocean, especially in the department of Charente Inférieure.

Of other animals we mention only a few: the gecko of Mauritania is found on the Mediterranean coast. There are several species of vipers and of harmless snakes: the latter are in some places regarded as fit for food. Frogs are numerous and of many species: one, the prickly frog (*crapaud épineux*), is of great size and hideous form.

The tortoise, the salamander, the scorpion, and a kind of spider closely resembling the tarantula of Italy, are found. The bee and the silk-worm are the most valuable insects; and the Spanish fly is sufficiently numerous to furnish an article of exportation.

Fisheries.—The coasts abound in fish of various kinds, the taking of which occupies a number of hands: the herring, the mackerel, and especially the sardine or pilchard, are the chief objects of attention to the fishermen of the coasts of the Channel and the Atlantic: the tunny and the anchovy, to the fishermen of the Mediterranean.

The sardine fishery of the coast of Bretagne is calculated to employ 1400 vessels, and (allowing five men to a vessel) 7000 men: there are above 250 curing-houses in which 1500 women find employment; each curing-house finds work enough for a cooper, and it is calculated that more than 8000 barrels of the fish are cured annually. The mackerel and herring fisheries are carried on by the inhabitants of Dieppe, St. Valery, Fécamp, Boulogne, and other towns on the coast of Normandie and Picardie. The whale and the cachelot have been found occasionally on the French coast.

The oyster is in great demand, especially in Paris. The best are found on the coast of the departments of Manche, Calvados, and Charente Inférieure. The mussel is used as food by the poor on some parts of the coast, and the crab, the lobster, and other crustacea are consumed to a considerable extent.

Administrative divisions, Civil, Military, Judicial, Ecclesiastical.—The present civil division of France is into 86 departments. The departments are under the government of a prefect, and are subdivided into circuits or arrondissements, each comprehending a certain number of communes which for their extent and average population may be compared with our parishes. [DEPARTMENTS.] This system of division was introduced by the National Assembly, A.D. 1789. The name of the department is usually borrowed from some marked natural feature, a river, a chain of mountains, &c.: the name of the arrondissement is invariably taken from its chief town. As the divisions (military governments or provinces) and the principal subdivisions which existed before the introduction of the present departments are continually referred to, though no longer officially recognised, it is desirable to give them in a tabular form, together with the departments which correspond to them.

Military Governments, with their respective Capitals (in brackets). Principal Subdivisions.	Departments, with the population, 1836.	Capital of Department (in Capitals)—Chief towns of Arrondissements* (in Italics), with the population of their respective communes in 1836, and other places of importance.
I. La Flandre Françoise (*Lille*). La Flandre Maritime, La Flandre Wallonne, Le Cambraisis, Le Hainaut François.	1. NORD, 1,026,417.	Lille, 72,005; *Dunkerque*, 23,808; *Valenciennes*, 19,499; *Douai*, 19,173; *Cambrai*, 17,846; *Hazebrouck*, 7674; *Avesnes*, 3030; Roubaix; Tourcoing.
II. L'Artois (*Arras*).	2. PAS DE CALAIS, 664,654.	Arras, 23,485; *Boulogne*, 25,732; *St. Omer*, 19,032; *Béthune*, 6805; *Montreuil*, 3867; *St. Pól*, 3452; Calais.
III. La Picardie (*Amiens*). L'Amienois, La Santerre, Le Vermandois, Le Thiérache, Le Pays reconquis or Le Calaisis, Le Boulonnois, Le Ponthieu, Le Vimeux.	3. SOMME, 552,706.	Amiens, 46,129; *Abbeville*, 18,247; *Péronne*, 4119; *Montdidier*, 3790; *Doullens*, 3912.
IV. La Normandie (*Rouen*). Le Pays de Caux, Le Pays de Bray, Le Vexin Normand, Le Roumois, Le Pays de la Campagne, Le Pays d' Ouche, Le Lieuvin, Le Pays d'Auge, Les Marches, Le Bessin, Le Bocage, Le Pays d'Houlme, Le Cotentin, or Le Cotantin, L'Avranchin.	4. SEINE INFE'RIEURE, 720,525.	Rouen, 92,083; *Le Hâvre*, 25,568; *Dieppe*, 16,820; *Yvetot*, 9213; *Neufchâtel*, 3463; Elbœuf; Fécamp.
	5. EURE, 424,762.	Evreux, 10,287; *Louviers*, 9927; *Pont Audemer*, 5358; *Bernay*, 7244; *Les Andelys*, 5085.
	6. CALVADOS, 501,775.	Caen, 41,876; *Lisieux*, 11,473; *Bayeux*, 9676; *Falaise*, 9498; *Vire*, 7339; *Pont L'Eveque*, 2137.
	7. MANCHE, 594,382.	St. Lô, 9065; *Cherbourg*, 19,315; *Coutances*, 7663; *Avranches*, 7690; *Valognes*, 6655; *Mortain*, 2521.
	8. ORNE, 443,688.	Alençon, 13,934; *Argentan*, 5772; *Mortagne*, 5692; *Domfront*, 2417.
V. L'Ile de France (*Paris*). Le Parisis, Le Beauvaisis, Le Laonnois, Le Soissonnois, Le Noyonnois, Le Vexin François, La Gouelle, Le Valois, Le Mantois, Le Hurepoix, La Brie Françoise, Le Gâtinois François.	9. AISNE, 527,095.	Laon, 8230; *St. Quentin*, 20,570; *Soissons*, 8124; *Château Thierry*, 4761; *Vervins*, 2571.
	10. OISE, 398,641.	Beauvais, 13,082; *Compiègne*, 8895; *Senlis*, 5016; *Clermont*, 3235.
	11. SEINE, 1,106,891.	Paris, 909,126; *St. Denis*, 9332; *Sceaux*, 1670.
	12. SEINE ET OISE, 449,582.	Versailles, 29,209; *E'tampes*, 7896; *Pontoise*, 5408; *Mantes*, 3818; *Corbeil*, 3690; *Rambouillet*, 3006; St. Germain-en-Laye.
	13. SEINE ET MARNE, 325,881.	Melun, 6846; *Meaux*, 7809; *Fontainebleau*, 8021; *Provins*, 6007; *Coulommiers*, 3573.
VI. La Champagne (*Troyes*). Le Réthelois, Le Porcien, Argonne, La Principauté de Sedan et Raucourt, Le Rhémois or Rémois, Le Perthois, La Champagne (properly so called), Le Valage, Le Bassigny, Le Senonois, La Brie.	14. MARNE, 345,245.	Chalons-sur-Marne, 12,952; *Reims*, 38,359; *Vitry-le-François*, 6822; *Epernay*, 3457; *Sainte Menehould*, 3962.
	15. ARDENNES, 306,861.	Mezieres, 4083; *Sedan*, 13,719; *Réthel*, 6771; *Rocroy*, 3682; *Vouziers*, 2101.
	16. AUBE, 253,870.	Troyes, 25,563; *Bar-sur-Aube*, 3940; *Nogent-sur-Seine*, 3355; *Arcis-sur-Aube*, 2752; *Bar-sur-Seine*, 2350.
	17. HAUTE MARNE, 255,969.	Chaumont, 6318; *Langres*, 7677; *Vassy*, 2694.
VII. La Lorraine (*Nancy*). La Lorraine (properly so called), La Lorraine Allemande, Le Pays des Vosges, Le Pays Messin, Le Toulois, Le Verdunois, Le Luxembourg François, La Principauté de Bouillon, Le Barrois.	18. MEUSE, 317,701.	Bar-le-Duc, 12,383; *Verdun*, 10,577; *Commercy*, 3716; *Montmédy*, 2251.
	19. MOSELLE, 427,250.	Metz, 42,793; *Thionville*, 5680; *Sarreguemines*, 4113; *Briey*, 1730.
	20. MEURTHE, 424,366.	Nancy, 31,445; *Luneville*, 12,798; *Toul*, 7333; *Château Salins*, 2621; *Sarrebourg*, 2340.
	21. VOSGES, 411,034.	Epinal, 9526; *St. Dié*, 7900; *Mirecourt*, 5684; *Remiremont*, 5055; *Neufchâteau*, 3645.
VIII. L'Orleanois (*Orléans*). Orléanois (properly so called), La Beausse or Beauce (comprehending Le Chartrain, Le Dunois, Le Vendômois,) Le Blaisois, La Sologne, Le Gâtinois Orléanois.	22. EURE ET LOIR, 285,058.	Chartres, 14,750; *Châteaudun*, 6776; *Nogent-le-Rotrou*, 6861; *Dreux*, 6379.
	23. LOIRET, 316,189.	Orleans, 40,161; *Montargis*, 7757; *Gien*, 5330; *Pithiviers*, 4023.
	24. LOIR ET CHER, 214,043.	Blois, 13,628; *Vendôme*, 8206; *Romorantin*, 7181.
IX. La Touraine (*Tours*). La Haute Touraine, La Basse Touraine.	25. INDRE ET LOIRE, 304,271.	Tours, 26,669; *Chinon*, 6911; *Loches*, 4753.
X. Le Berry or Berri (*Bourges*). Le Haut Berri, Le Bas Berri.	26. CHER, 276,853.	Bourges, 25,324; *St. Amand*, 7382; *Sancerre*, 3482.
	27. INDRE, 257,350.	Chateauroux, 13,847; *Issoudun*, 11,654; *La Châtre*, 4471; *Le Blanc*, 5095.
XI. Le Nivernois (*Nevers*).	28. NIE'VRE, 297,550.	Nevers, 16,967; *Cosne*, 6212; *Clamecy*, 5539; *Château-Chinon*, 2775.
XII. Le Bourbonnois (*Moulins*). Le Haut Bourbonnois, Le Bas Bourbonnois.	29. ALLIER, 309,270.	Moulins, 15,231; *Gannat*, 5109; *Montluçon*, 5034; *La Palisse*, 2286.
XIII. La Marche (*Guéret*). La Haute Marche, La Basse Marche.	30. CREUSE, 276,234.	Gueret, 4796; *Aubusson*, 5631; *Bourganeuf*, 2940; *Boussac*, 952.
XIV. Le Limousin or Limosin (*Limoges*). Le Haut Limousin, Le Bas Limousin.	31. CORRE'ZE, 302,433.	Tulle, 9700; *Brive*, 8843; *Ussel*, 4135.
	32. HAUTE VIENNE, 293,011.	Limoges, 29,706; *Bellac*, 3581; *St. Yrieix*, 6900; *Rochechouart*, 4123.
XV. L'Auvergne (*Clermont*). La Haute Auvergne (comprehending La Haute Auvergne, properly so called, Carladez), La Basse Auvergne (comprehending La Basse Auvergne, properly so called, Le Pays de Combrailles, La Limagne, Le Livradois, and Le Dauphiné d'Auvergne.	33. CANTAL, 262,117	Aurillac, 10,889; *St. Flour*, 5640; *Murat*, 2503; *Mauriac*, 3420.
	34. PUY DE DOME, 589,438.	Clermont, 32,427; *Riom*, 11,473; *Thiers*, 9982; *Issoire*, 5741; *Ambert*, 8016.

* As the capital of a department is always the capital of an arrondissement, and as all the chief towns of arrondissements are given, the number of these subdivisions in any department is readily ascertained.

Province	Department	Chief Towns
XVI. Le Maine (*Le Mans*). Le Haut Maine, Le Bas Maine, Le Perche.	35. SARTHE, 466,888.	Le Mans, 23,164; *La Flèche*, 6420; *Mamers*, 5704; *Saint Calais*, 3783.
	36. MAYENNE, 361,765.	Laval, 17,810; *Mayenne*, 9782; *Château Gonthier*, 6226.
XVII. L'Anjou (*Angers*). Le Haut Anjou, Le Bas Anjou (of which Le Saumurois is a part).	37. MAINE ET LOIRE, 477,270.	Angers, 35,901; *Saumur*, 11,925; *Baugé*, 3400; *Beaupréau*, 3288; *Ségré*, 2130.
XVIII. La Bretagne (*Rennes*). La Haute Bretagne, La Basse Bretagne, La Moyenne Bretagne.	38. LOIRE INFE'RIEURE, 470,768.	Nantes, 75,895; *Paimbœuf*, 3872; *Ancenis*, 3667; *Châteaubriant*, 3634; *Savenay*, 2079.
	39. MORBIHAN, 449,743.	Vannes, 11,623; *Lorient*, 18,975; *Pontivy*, 6378; *Ploërmel*, 5207.
	40. FINISTERE, 546,955.	Quimper, 9715; *Brest*, 29,773; *Morlaix*, 9740; *Quimperlé*, 5541; *Châteaulin*, 2968.
	41. COTES DU NORD, 605,563.	St. Brieuc, 11,382; *Dinan*, 7356; *Guingamp*, 6466; *Lannion*, 5461; *Loudéac*, 6865.
	42. ILLE ET VILAINE, 547,259.	Rennes, 35,552; *St. Malo*, 9744*; *Vitré*, 8901; *Fougères*, 9384; *Redon*, 4506; *Montfort*, 1772.
XIX. Le Poitou (*Poitiers*). Le Haut Poitou (comprehending Le Haut Poitou, properly so called, Le Loudunois, Le Mirebelois, Le Thouarsois, La Gâtine, and Le Niortois), Le Bas Poitou.	43. VENDE'E, 341,312.	Bourbon Vendee, 5257; *Fontenay*, 7650; *Les Sables d'Olonne*, 4778.
	44. DEUX SE'VRES, 304,105.	Niort, 18,197; *Parthenay*, 4288; *Melle*, 2724; *Bressuire*, 1894.
	45. VIENNE, 288,002.	Poitiers, 22,000; *Châtellerault*, 9695; *Loudon*, 5032; *Montmorillon*, 4157; *Civray*, 2100.
XX. Le Pays D'Aunis (*La Rochelle*).	46. CHARENTE, 365,126.	Angoulême, 16,910; *Cognac*, 3830; *Ruffec*, 2859; *Barbézieux*, 3013; *Confolens*, 2766.
XXI. La Saintonge (*Saintes*) and L'Angoumois (Angoulême), La Haute Saintonge, La Basse Saintonge.	47. CHARENTE INFE'RIEURE, 449,649.	La Rochelle, 14,857; *Rochefort*, 15,441; *Saintes*, 9559; *St. Jean d'Angély*, 5915; *Marennes*, 4542; *Jonzac*, 2514.
XXII. L'Alsace (*Strasbourg*). La Haute Alsace, La Basse Alsace.	48. HAUT RHIN, 447,019.	Colmar, 15,958; *Belfort*, 5687; *Altkirch*, 3028; Mülhausen.
	49. BAS RHIN, 561,859.	Strasbourg, 57,885; *Schélestadt*, 9700; *Weissembourg*, 5575; *Saverne*, 5352.
XXIII. La Franche Comté (*Besançon*). Les Baillages d'Amont, du Milieu & d'Aval.	50. HAUTE SAONE, 343,298.	Vesoul, 5887; *Gray*, 6535; *Lure*, 2950.
	51. DOUBS, 276,274.	Besançon, 29,718; *Montbéliard*, 5117; *Pontarlier*, 4890; *Baume*, 2519.
	52. JURA, 315,355.	Lons-le-Saulnier, 7684; *Dôle*, 10,137; *Poligny*, 6492; *St. Claude*, 5238.
XXIV. La Bourgogne (*Dijon*). Le Dijonnois, Le Pays de Montagne, L'Auxerrois, L'Auxois, L'Autunois, Le Charolois or Charollois, Le Brionois, Le Mâconnois, Le Châlonois, La Bresse, Le Bugey (in which are comprehended Le Bugey, properly so called, and Le Valromey), Le Pays de Gex, La Principauté de Dombes.	53. YONNE, 355,237.	Auxerre, 11,575; *Sens*, 9095; *Avallon*, 5309; *Joigny*, 5494; *Tonnerre*, 4271.
	54. COTE D'OR, 385,624.	Dijon, 24,817; *Beaune*, 10,678; *Sémur*, 4035; *Châtillon-sur-Seine*, 4430.
	55. SAONE ET LOIRE, 538,507.	Macon, 11,944; *Châlons-sur-Saône*, 12,400; *Autun*, 10,435; *Louhans*, 3674; *Charolles*, 3226.
	56. AIN, 346,188.	Bourg, 9528; *Belley*, 3970; *Nantua*, 3696; *Trévoux*, 2559; *Gex*, 2894.
XXV. Le Lyonnois (*Lyon*). Le Lyonnois, properly so called, Le Franc Lyonnois, Le Beaujolois, Le Forez.	57. RHONE, 482,024.	Lyon, 150,814; *Villefranche*, 7553; La Guillotière; La Croix Rousse.
	58. LOIRE, 412,497.	Montbrison, 6266; *St. Etienne*, 41,534; *Roanne*, 9910; Rive de Gier.
XXVI. Le Languedoc (*Toulouse*). Le Haut Languedoc, Le Bas Languedoc, Les Cévennes (comprehending Les Cévennes, properly so called, ou Comté d'Alaix, L'Uzégeois), Le Vivarais, Le Velay, and Le Gevaudan.	59. HAUTE LOIRE, 295,384.	Le Puy, 14,924; *Brioude*, 5247; *Yssengeaux*, 7621.
	60. ARDE'CHE, 353,752.	Privas, 4219; *Tournon*, 4174; *Largentière*, 2879.
	61. LOZE'RE, 141,733.	Mende, 5909; *Marvejols*, 4025; *Florac*, 2246.
	62. GARD, 366,259.	Nîmes, 43,036; *Alais*, 13,566; *Uzès*, 6856; *Le Vigan*, 5049; Beaucaire.
	63. HERAULT.	Montpellier, 35,506; *Béziers*, 16,233; *Lodève*, 11,208; *Saint Pons*, 6995; Cette.
	64. AUDE, 281,088.	Carcassonne, 18,907; *Narbonne*, 10,792; *Castelnaudary*, 10,186; *Limoux*, 7105.
	65. TARN, 346,614.	Alby, 11,801; *Castres*, 17,602; *Gaillac*, 8199; *Lavaur*, 7205.
	66. HAUTE GARONNE, 454,727.	Toulouse, 77,372; *St. Gaudens*, 6020; *Muret*, 3970; *Villefranche*, 2765.
XXVII. Le Roussillon (*Perpignan*). Le Roussillon proper, Le Valespir, Le Conflent, Le Capsir, La Cerdagne Françoise, La Vallée de Carol.	67. PYRE'NE'ES ORIENTALES, 164,325.	Perpignan, 17,618; *Prades*, 3013; *Céret*, 3302.
XXVIII. La Comte de Foix (*Foix*). La Partie Haute, La Partie Basse, Le Donnezan.	68. ARRIE'GE OU ARIE'GE, 260,536.	Foix, 4699; *Pamiers*, 6905; *Saint Girons*, 4282.
XXIX. La Guienne or Guyenne (*Bordeaux*), and La Gascogne (*Auch*).	69. AVEYRON, 370,951.	Rhodez or Rodez, 9685; *Milhau*, 10,450; *Villefranche*, 8738; *Ste. Affrique*, 6421; *Espalion*, 4082.
La Guienne. La Guienne (properly so called), or Le Bordelois, Le Basadois, Le Perigord, L'Agenois, Le Quercy, Le Rouergue.	70. LOT, 287,003.	Cahors, 12,417; *Figeac*, 6237; *Gourdon*, 5334.
	71. TARN ET GARONNE, 242,184.	Montauban, 23,865; *Moissac*, 10,618; *Castel-Sarrasin*, 7408.

* St. Servan is little else than a suburb of St. Malo, to which in population it is about equal.

Ancient Provinces	Departments	Chief Towns
LA GASCOGNE. Le Condomois, Le Gabardan, La Chalosse, Le Pays des Landes, Le Pays des Basques (comprehending La Basse Navarre, Le Pays de Labour, and Le Pays de Soule), Le Bigorre, L'Armagnac (comprehending Le Haut or Le Blanc Armagnac, Le Bas or Le Noir Armagnac *), Le Comminge (comprehending Le Haut Comminge, Le Bas Comminge, and Le Couserans†).	72. GERS, 312,882.	AUCH, 10,461 ; *Condom*, 7098 ; *Lectoure*, 6355 ; *Mirande*, 2532 ; *Lombez*, 1622.
	73. HAUTES PYRE'NE'ES, 244,170.	TARBES, 12,630 ; *Bagnères*, 8108 ; *Argelès*, 1420.
	74. LANDES, 284,918.	MONT DE MARSAN, 4082 ; *Dax*, 4778 ; *St. Sever*, 5863.
	75. LOT ET GARONNE, 346,400.	AGEN, 13,399 ; *Villeneuve d'Agen*, 11,222 ; *Marmande*, 7527 ; *Nérac*, 6603.
	76. DORDOGNE, 487,502.	PERIGUEUX, 11,576 ; *Bergerac*, 9285 ; *Sarlat*, 5669 ; *Nontron*, 3573 ; *Riberac*, 3775.
	77. GIRONDE, 555,809.	BORDEAUX, 98,705 ; *Libourne*, 9714 ; *Blaye*, 3801 ; *La Réole*, 3931 ; *Bazas*, 4446 ; *Lesparre*, 1404.
XXX. LE BEARN (*Pau*).	78. BASSES PYRE'NE'ES, 446,398.	PAU, 12,607 ; *Bayonne*, 15,912 ; *Oloron* or *Oléron*, 6620 ; *Orthez*, 7857 ; *Mauléon*, 1259.
XXXI. LE DAUPHINE (*Grenoble*). Le Haut Dauphiné (comprehending Le Grésivaudan, Le Royanès, Le Champsaur, Le Briançonnois, L'Embrunois, Le Gapençois, and Les Baronnies), Le Bas Dauphiné (comprehending Le Viennois, Le Valentinois, Le Tricastinois, Le Diois, and La Principauté d'Orange, now comprehended in the Department of Vaucluse).	79. HAUTES ALPES, 131,162.	GAP, 7854 ; *Embrun*, 3169 ; *Briançon*, 3455.
	80. DROME, 305,499.	VALENCE, 10,406 ; *Montélimar*, 7966 ; *Die*, 3900 ; *Nyons*, 3208 ; Romans.
	81. ISE'RE, 573,645.	GRENOBLE, 28,969 ; *Vienne*, 16,484 ; *St. Marcellin*, 2885 ; *La Tour du Pin*, 2484.
XXXII. LA PROVENCE (*Aix*). La Haute Provence, La Basse Provence.	82. BOUCHES DU RHONE, 362,325.	MARSEILLE, 146,239 ; *Aix*, 24,660 ; *Arles*, 20,048 ; Tarascon.
	83. VAR, 323,404.	DRAGUIGNAN, 9794 ; *Toulon*, 35,322 ; *Grasse*, 12,825 ; *Brignoles*, 5652 ; Hieres.
	84. BASSES ALPES, 159,045.	DIGNE, 6365 ; *Sisteron*, 4546 ; *Forcalquier*, 3022 ; *Barcelonnette*, 2154 ; *Castellane*, 2069.
LA CORSE or CORSICA. Not included in the thirty-two provincial governments.	85. CORSE, 207,889.	AJACCIO, 9003 ; *Bastia*, 13,061 ; *Corte*, 3587 ; *Sartène*, 2682 ; *Calvi*, 1457.
LE COMTAT D'AVIGNON and LE COMTAT VENAISSIN, in reality subdivisions of Provence, but subject to the Pope ; until ceded by him to France in 1791.	86. VAUCLUSE, 246,071.	AVIGNON, 31,786 ; *Carpentras*, 9224 ; *Orange*, 8874 ; *Apt*, 5958.

* Armagnac had other subdivisions more minute : two of these subdivisions were strictly what was called Le Haut or Le Blanc Armagnac, and Le Bas or Le Noir Armagnac.

† It is on the authority of the 'Dictionnaire Universelle de la France' that we make Le Couserans a subdivision of Le Comminge: other authorities make them independent.

Political Divisions and Administration.—This division into departments serves as a basis for all the other administrative divisions.

France is divided for military purposes into nineteen provinces or 'military divisions:' of these we subjoin a list, according to the arrangement made in 1829, when two military divisions, the head-quarters of which were at Caen and Perigueux, were suppressed.

No. of Divisions.	Head Quarters.	Departments included.
I.	PARIS.	Seine, Seine et Oise, Seine et Marne, Aisne, Oise, Loiret, Eure et Loir.
II.	CHALONS.	Ardennes, Meuse, Marne.
III.	METZ.	Moselle, Meurthe, Vosges.
IV.	TOURS.	Indre et Loire, Loir et Cher, Maine et Loire, Mayenne, Sarthe.
V.	STRASBOURG.	Haut Rhin, Bas Rhin.
VI.	BESANÇON.	Ain, Doubs, Jura, Haute Saône.
VII.	GRENOBLE.	Isère, Drôme, Hautes Alpes.
VIII.	MARSEILLE.	Basses Alpes, Vaucluse, Bouches du Rhône.
IX.	MONTPELLIER.	Ardèche, Gard, Lozère, Hérault, Tarn, Aveyron.
X.	TOULOUSE.	Aude, Pyrénées Orientales, Arriège, Haute Garonne, Hautes Pyrénées, Gers, Tarn et Garonne.
XI.	BORDEAUX.	Landes, Gironde, Basses Pyrénées, Dordogne, Lot, Lot et Garonne.
XII.	NANTES.	Charente Inférieure, Loire Inférieure, Deux Sèvres, Vendée, Vienne, Charente.
XIII.	RENNES.	Côtes du Nord, Finistère, Ille et Vilaine, Morbihan.
XIV.	ROUEN.	Seine Inférieure, Eure, Manche Calvados, Orne.
XV.	BOURGES.	Cher, Indre, Allier, Creuse, Nièvre, Haute Vienne, Corrèze.
XVI.	LILLE.	Nord, Pas de Calais, Somme.
XVII.	BASTIA.	Corse.
XVIII.	DIJON.	Aube, Haute Marne, Yonne, Côte d'Or, Saône et Loire.
XIX.	LYON.	Rhône, Loire, Cantal, Puy de Dôme, Haute Loire.

The principal fortresses are: along or near the Belgian, Prussian, and Bavarian frontier—Gravelines, Dunkerque, Lille, Douai, Cambrai, Valenciennes, Condé, Maubeuge, Avesnes, Rocroy, Givet et Charlemont, Mézières, Sedan, Thionville, Metz, Bitche, and Weissembourg ; along the Rhenish frontier—Haguenau, Strasbourg, Schelestadt, and Neuf Brisach ; towards the Jura—Béfort or Belfort, Besançon, and the new Fort de l'Ecluse ; towards the Alps and the Sardinian frontier—Grenoble and Briançon ; along the Spanish or Pyrenean frontier—Perpignan, Bellegarde, Mont Louis, St.

Jean-Pied-de-Port, and Bayonne. The naval dock and building yards are Brest, Toulon, Rochefort, Cherbourg, and Lorient. Sloops of war are built also at Bayonne, Nantes, and St. Servan, a suburb of St. Malo. In time of war Dunkerque and St. Malo send out a great number of privateers.

The administration of the laws in France has led to other divisions. The smallest judicial divisions are cantons, each of which is under the jurisdiction of a *juge de paix* (justice of peace), and in the rural districts comprehends several communes; but in the large towns, which consist of but one commune, there are usually several *juges*. These *juges de paix* have a final jurisdiction in smaller matters; and all suits must come before them, with a view, if possible, to an amicable adjustment, before they are carried into a superior court. They are all salaried, and are professional men. The whole number of cantons in the kingdom is 2834. The *maires* of communes appear to have also some judicial authority. The *Tribunaux de Première Instance*, or primary courts, which may perhaps be compared to our quarter-sessions, are one for every arrondissement. The whole number of arrondissements in France is 363. Each tribunal consists of from three to eight or more members (besides supplementary members), according to the population or business of the arrondissement, with a *procureur du roi*, or attorney for the crown. These courts take cognizance of civil and criminal cases within certain limits, but not of offences against the state. The section of the tribunal which takes cognizance of criminal cases is called *Tribunal de Police Correctionnelle*. The *Cours Royales* (twenty-seven in number) are the highest courts (with the exception of the *Cour de Cassation*), and may be compared with our assize courts. They have jurisdiction over several departments as given below, and the number of the judges varies according to the extent and business of the circuit over which they preside. The *Cour Royale* of Paris consists of fifty judges, and the whole number of judges of these courts is about nine hundred: their salaries are very small. Each *cour royale* is divided into several chambers; one decides on bills of indictment, in the same manner as an English grand jury; another tries criminal cases; others take cognizance of civil cases. Some members of these courts visit the chief towns of the departments subject to their jurisdiction about once in three months for the purpose of holding *Cours d'Assise*, or assize courts for criminal cases exclusively. An appeal lies from the subordinate courts to the *Cours Royales*; but not from these to any other court, except to the *Cour de Cassation*, at Paris, and that, not on questions of fact, but only as to matters of law. The *Cour de Cassation* can, if it finds any defect of this kind, order a new trial before another *Cour Royale*. [CASSATION.] The decisions of all these tribunals are regulated by *Les Cinq Codes*. [CODES, LES CINQ.] Juries are only occasionally employed, and under regulations materially different from our own.

COURS ROYALES.

Place of sitting.	Departments in their jurisdiction.
AGEN.	Gers, Lot, Lot et Garonne.
AIX.	Basses Alpes, Bouches du Rhône, Var.
AMIENS.	Aisne, Oise, Somme.
ANGERS.	Maine et Loire, Mayenne, Sarthe.
BASTIA.	Corse.
BESANÇON.	Doubs, Haute Saône, Jura.
BORDEAUX.	Charente, Dordogne, Gironde.
BOURGES.	Cher, Indre, Nièvre.
CAEN.	Calvados, Manche, Orne.
COLMAR.	Bas Rhin, Haut Rhin.
DIJON.	Côte d'Or, Haute Marne, Saône et Loire.
DOUAI.	Nord, Pas de Calais.
GRENOBLE.	Drôme, Hautes Alpes, Isère.
LIMOGES.	Corrèze, Creuse, Haute Vienne.
LYON.	Ain, Loire, Rhône.
METZ.	Ardennes, Moselle.
MONTPELLIER.	Aude, Aveyron, Hérault, Pyrénées Orientales.
NANCY.	Meurthe, Meuse, Vosges.
NÎMES.	Ardèche, Gard, Lozère, Vaucluse.
ORLEANS.	Indre et Loire, Loiret, Loir et Cher.
PARIS.	Aube, Eure et Loir, Marne, Seine, Seine et Marne, Seine et Oise, Yonne.
PAU.	Basses Pyrénées, Hautes Pyrénées, Landes.
POITIERS.	Charente Inférieure, Deux Sèvres, Vendée, Vienne.
RENNES.	Côtes du Nord, Finistère, Ile et Vilaine, Loire Inférieure, Morbihan.
RIOM.	Allier, Cantal, Haute Loire, Puy de Dôme.
ROUEN.	Eure, Seine Inférieure.
TOULOUSE.	Arriège, Haute Garonne, Tarn, Tarn et Garonne.

The whole cost of the administration of justice in France, according to the Budget of 1838, is 19,000,675 francs, which is thus distributed:—

Central Administration	524,800	francs
Council of State	516,400	"
Cour de Cassation	969,000	"
Cours Royales	4,243,130	"
Cours d'Assises	154,400	"
Tribunaux de Première Instance	5,880,145	"
Tribunaux de Commerce et de Police	242,300	"
Justices de Paix	3,103,200	"
Expenses of Criminal Justice, and of Civil and Criminal Statistics	3,322,000	"
Miscellaneous	45,000	"
	19,000,375	francs

The ecclesiastical division of France has undergone many changes. Before the Revolution there were eighteen archbishoprics, exclusive of Avignon. Of these, one (Cambrai) has been reduced to a simple bishopric, and four united with others, viz., Arles and Embrun with Aix; Vienne with Lyon; and Narbonne with Toulouse: the addition of Avignon makes the present number fourteen. The archbishops, before the Revolution, had as suffragans one hundred and seven bishops in France; one in the county of Nice (Nice), and two (Annecy and Maurienne), in Savoy, in Italy; two (Bâle and Lausanne) in Switzerland; and two (Tournay and Namur) in the Low Countries. Besides these, four French bishoprics were under the jurisdiction of German archbishops, making the whole number of French bishoprics one hundred and eleven. Of these dioceses forty-nine have been suppressed; viz., Agde, Alais, Aleth, Apt, Avranches, Auxerre (the archbishop of Sens now takes an additional title from Auxerre); Bazas, Bertrand (St.), Bethléem, Béziers, Boulogne, Castres, Couserans, Condom, Dax, Die, Dol, Glandèves, Grasse, Laon, Lavaur, Lectoure, Lescar, Lisieux, Lodève, Lombez, Malo (St.), Mirepoix, Noyon, Oléron, Omer (St.), Orange. Papoul (St.), Pol (St.), Pol-de-Léon (St.), Pons (St.), Rieux, Riez-Saintes, Sarlat, Senez, Senlis, Sisteron, Toul, Toulon, Treguier, Uzès, Vabres, and Vence: the remainder, with the addition of the ex-archbishopric of Cambrai and the new sees of Nancy, St. Dié, and Moulins, make the present sixty-six bishoprics of France.

Archbishoprics in Italics, and Bishoprics with the Departments included in them. Each Archbishopric is followed by its suffragan dioceses.

Paris.	Seine.	Nevers	Nièvre.
Chartres	Eure et Loir.	Moulins	Allier.
Meaux	Seine et Marne.	*Reims.*	
Orléans	Loiret.	Arrondissement of Reims, in the department of Marne,	Ardennes.
Blois	Loir et Cher.	Soissons	Aisne.
Versailles	Seine et Oise.	Châlons	Marne (except the arrondissement of Reims).
Arras	Pas de Calais.	Beauvais	Oise.
Cambrai	Nord.	Amiens	Somme.
Lyon et Vienne.	Rhône, Loire.	*Tours.*	Indre et Loire.
Autun	Saône et Loire.	Le Mans	Sarthe, Mayenne.
Langres	Haute Marne.	Angers	Maine et Loire.
Dijon	Côte d'Or.	Rennes	Ile et Vilaine.
St. Claude	Jura.	Nantes	Loire Inférieure.
Grenoble	Isère.	Quimper	Finistère.
Rouen.	Seine Inférieure.	Vannes	Morbihan.
Bayeux	Calvados.	Saint Brieuc	Côtes du Nord
Evreux	Eure.		
Séez	Orne.		
Coutances	Manche.		
Sens et Auxerre.	Yonne.		
Troyes	Aube.		

Bourges.	Cher, Indre.
Clermont	Puy de Dôme.
Limoges	Creuse, Haute Vienne.
Le Puy	Haute Loire.
Tulle	Corrèze.
Saint Flour	Cantal.
Alby.	Tarn.
Rodez	Aveyron.
Cahors	Lot.
Mende	Lozère.
Perpignan	Pyrénées Orientales.
Bordeaux.	Gironde.
Agen	Lot et Garonne.
Angoulême	Charente.
Poitiers	Vienne, Deux Sèvres.
Périgueux	Dordogne.
La Rochelle	Charente Inférieure.
Luçon	Vendée.
Auch.	Gers.
Aire	Landes.
Tarbes	Hautes Pyrénées.
Bayonne	Basses Pyrénées.
Toulouse et Narbonne.	Haute Garonne.
Montauban	Tarn et Garonne.
Pamiers	Arriège.
Carcassonne	Aude.
Aix, Arles, Embrun.	Bouches du Rhône (except the arrondissement of Marseille).
Marseille	Arrondissement of Marseille in the department of Bouches du Rhône.
Fréjus	Var.
Digne	Basses Alpes.
Gap	Hautes Alpes.
Ajaccio	Corse.
Besançon.	Doubs, Haute Saône.
Strasbourg	Haut Rhin, Bas Rhin.
Metz	Moselle.
Verdun	Meuse.
Belley	Ain.
Saint Dié	Vosges.
Nancy	Meurthe.
Avignon.	Vaucluse.
Nîmes	Gard.
Valence	Drôme.
Viviers	Ardèche.
Montpellier	Hérault.

Government.—The general outline of the supreme government of France bears a resemblance to our own, being an hereditary constitutional or limited monarchy. Its general constitution is defined in the charter granted by Louis XVIII. upon his restoration in A.D. 1814; modified in 1830 after the revolution which drove out the elder branch of the Bourbons; and farther modified since that time. The charter, as modified after the revolution of 1830, consists of sixty-seven articles arranged under seven heads. We give an abstract of its chief provisions, as best conveying an idea of the present constitution of France. The chief alteration made since has been the abolition of hereditary peerages, and the restriction of the liberty of the press.

1st head, containing eleven articles.—*Droit public des Français* (*Public or national Rights of the French*).—This head provides for the equality of all Frenchmen in the eye of the law, their equal admissibility to civil and military employments, and their equal freedom from arrest otherwise than by legal process. It guarantees the full enjoyment of religious liberty; and while it recognizes Catholicism as the religion of the majority of Frenchmen, provides for the payment not only of the Catholic priesthood, but of the ministers of other Christian denominations, out of the public purse. It insures the liberty to all Frenchmen of printing and publishing their opinions (subsequent enactments have, however, restricted this freedom), and prohibits the re-establishment of the censorship. It abolishes the conscription; provides for the oblivion of all political offences previous to the restoration of the Bourbons; and guarantees the security of property (including the so-called 'national domains'), except when the public good, as made out in a legal manner, requires the sacrifice of individual property, in which case the owner must be indemnified.

2nd head, containing eight articles.—*Formes du Gouvernement du Roi* (*Limits of the kingly Power*).—This head secures to the king the supreme executive power, the command of the army and navy, the right of making war and treaties of peace, alliance, and commerce; of nominating to all the offices of public administration; and of making all regulations needful for the execution of the laws, without the power of suspending them or dispensing with them. It provides that the legislative functions shall be exercised by the king, the Chamber of Peers, and the Chamber of Deputies; that every law must be agreed to by a majority of each chamber, (the discussions and votes of which are to be free,) and sanctioned by the king; that bills may originate with either of the three branches of the legislature, except money bills, which must originate in the Chamber of Deputies; and that a bill rejected by either branch of the legislature cannot be brought in again the same session. The civil list is fixed at the commencement of every reign, and cannot be altered during that reign.

3rd head, containing ten articles.—*De la Chambre des Pairs* (*Of the Chamber of Peers*).—This head provides for the assembling of this chamber simultaneously with the deputies, and renders every sitting illegal (except when the chamber is exercising its judicial power) unless it is held during the session of the deputies. The nomination of the peers is vested in the king; (the princes of the blood are peers by right of birth;) their number is unlimited, and their dignity may be for life or hereditary. (Hereditary peerages have been since abolished.) The peers have no right of entry into the chamber under twenty-five years of age or of voting under thirty. The chancellor of France is president, or, in his absence, a peer nominated by the king. The sittings of the peers are public. The chamber takes cognizance of offences against the state. A peer can only be arrested by the authority of the chamber, and is not amenable to any other tribunal than the chamber in criminal matters.

4th head, containing sixteen articles.—*De la Chambre des Deputés* (*Of the Chamber of Deputies*).—This head provides for the election of the deputies and the sittings of the chamber. The electors must be not less than twenty-five years of age and the deputies not less than thirty (since reduced to twenty-five), and each must possess whatever other qualifications the law requires. The deputies are elected for five years, and one-half of the deputies for each department must be residents in it. The chamber elects its own president at the opening of each session. Its sittings ordinarily are public; but any five members can require that it form itself into a secret committee. Bills are discussed in separate *bureaux*, or committees. No tax can be levied without the consent of both chambers. The land-tax (*impôt foncier*) can be granted only year by year; other taxes may be voted for several years. The king convokes the two chambers, and prorogues and dissolves that of the deputies, but must in that case assemble a new one within three months. All members are free from arrest for debt during the session and for six weeks before and after, and from arrest on a criminal charge during the session, unless taken in the act or arrested by permission of the chamber.

5th head, containing two articles.—*Des Ministres* (*Of the Ministers*).—These may be members of either chamber; and have, besides, the right of entry into the other chamber, in which they can claim to be heard. The deputies may impeach the ministers; the peers alone have the right to try them.

6th head, containing twelve articles.—*De l'Ordre Judiciaire* (*Of the Administration of Justice*).—This head provides for the continuance of the previously existing institutions until properly modified by law; the publicity of criminal proceedings (except in particular cases); the non-removability of the judges (the justices of peace are however removable); and the right of the king to remit or commute the penalty awarded. It prohibits the confiscation of goods; the creation of special commissions or tribunals; and the withdrawal of any from the jurisdiction to which he is legally subject.

7th head, containing eight articles.—*Droits particuliers garantis par l'Etat* (*Individual Rights guaranteed by the State*).—Among other things, this head renders inviolable all engagements with the public creditor; provides for the government of the colonies by particular laws; and requires the king and his successors, on their accession, to swear to the faithful observance of the constitutional charter.

The deputies are all chosen by the departments: or, to borrow the language of our own institutions, they are all 'county members;' but the nature of the electoral qualification, which is the payment of rather more than 8*l.* direct taxes, precludes in those departments which contain large towns any undue predominance of the agricultural interest, or rather in the depressed condition of the agriculturist, secures the predominance of the residents in towns. The votes are given by ballot. The whole number of deputies is now 459, having been increased within the last few years from 430. They are thus returned:—

1 Department. Seine, (containing Paris and its environs) 14 members 14

1	Department. Nord, (containing Lille and other manufacturing towns) 12 members	12
1	Department. Seine Inférieure (containing Rouen) 11 members	11
1	Department. Gironde (containing Bordeaux), 9 members	9
2	Departments. Manche and Pas de Calais, 8 members each	16
15	Departments. Aisne, Calvados (containing Caen), Charente Inférieure, Dordogne, Eure, Ille et Vilaine (containing Rennes), Isère, Loire Inférieure (containing Nantes), Maine et Loire (containing Angers), Orne, Puy de Dome (containing Clermont), Saône et Loire, Sarthe, Seine et Oise, Somme (containing Amiens), 7 members each	105
10	Departments. Bouches du Rhône (containing Marseille), Côtes du Nord, Finistèrre, Morbihan, Moselle (containing Metz), Bas Rhin (containing Strasbourg), Haute Garonne (containing Toulouse), Hérault (containing Montpellier), Marne (containing Reims), Meurthe, 6 members each	60
25	Departments. Ain, Aude, Aveyron, Charente, Côte d'Or, Doubs, Gard (containing Nîmes), Gers, Loire (containing St. Etienne), Loiret (containing Orléans), Lot, Lot et Garonne, Mayenne, Oise, Basses Pyrénées, Haut Rhin, Rhône (containing Lyon), Seine et Marne, Tarn, Var, Vendée, Vienne, Haute Vienne, Vosges, and Yonne, 5 members each	125
20	Departments. Allier, Ardèche, Ardennes, Aube (containing Troyes), Cantal, Cher, Corrèze, Creuse, Drôme, Eure et Loir, Indre, Indre et Loire, Jura, Haute Marne, Meuse, Nièvre, Haute Saône, Deux Sèvres, Tarn, Tarn et Garonne, Vaucluse (containing Avignon), 4 members each	80
7	Departments. Arriège, Landes, Loir et Cher, Haute Loire, Lozère, Hautes Pyrénées, Pyrénées Orientales, 3 members each	21
3	Departments. Hautes Alpes, Basses Alpes, Corse, 2 members each	6
86	Departments.	459

⁎ The towns mentioned in the above list have in their respective communes a population of 30,000 or upwards, according to the census of 1831-2.

The cabinet council of the king consists of eight ministers for the following departments:—1, Finance; 2, the Interior; 3, Justice (the minister of justice is also keeper of the seals); 4, Marine: 5, Foreign Affairs; 6, War; 7, Public Instruction, and 8, Commerce and Manufactures. The superintendence of public worship, so far as the state has to do with it, has of late years been connected with the ministry of public instruction, of the interior, or of justice; at present it is connected with the last. There has not been since the revolution of 1830 a distinct ministry of public worship. (*Ministère des Cultes.*) Their salaries are commonly 120,000 francs (5000*l.*): the minister for foreign affairs has 150,000 francs (6250*l.*), and the minister of public instruction 100,000 francs, or above 4000*l.* One of these is appointed president of the council, and is considered as the head of the ministry, or in our phrase, prime minister.

Revenue, Expenditure, Army and Navy.—The chief branches of the revenue and expenditure will be best seen from the following statements of the 'budget' (a term in use in France as well as in England) of 1832, laid before the chambers in 1831; and of the budget for 1838, laid before the chambers of 1837:—

BUDGET FOR 1838.

It must be observed that this gives the anticipated revenue, and the sums granted by the Chambers.

REVENUE.

	francs.
Revenue arising from landed property	262,000,000
Poll tax, tax on personals, door and window tax	85,000,000
Patents	35,000,000
Stamps on registry, and changes of property	206,000,000
Revenue arising from the national property, such as the national domains, forests, &c.	39,000,000
Customs and indirect taxes	284,000,000
Produce of various works carried on on account of the government; as the manufacture of snuffs and of gunpowder, and the posts	129,000,000
Sundries and extraordinaries.	13,000,000
Total revenue	1,053,000,000
Or about	£43,875,000

EXPENDITURE.

	francs.
Ministry of justice and of public worship (including the charge of the legion of honour, and the *imprimerie royale*, or king's printing-office)	65,175,373
„ foreign affairs	7,348,622
„ marine	64,932,900
„ public instruction	19,005,673
„ finance (including interest and charges on the national debt, securities, sinking fund, pensions, and the charge of collecting the public revenue).	549,051,178
„ war	222,750,119
„ commerce and public works.	56,804,598
„ interior	74,417,776
Chamber of deputies	677,100
Total expenditure	1,060,163,339
Or about	£44,173,472

It is estimated that the national debt of France, on Jan. 1, 1838, will be as follows:—

	francs.
Rentes, 5 per cents.	147,053,472
4½ „	1,026,600
4 „	11,978,265
3 „	35,905,696
Sinking fund	44,616,463
Interest and principal of canals	9,936,000
Interest of securities	9,000,000
Interest on annuities	9,000,000
Annuities and pensions	58,050,000
Total	326,566,496
Deducting the sinking fund, and that portion of the debt which has been redeemed, the debt amounts to	254,566,496

Besides the revenues of the state, the communes raise taxes for defraying their own expenses: of these taxes the octrois, or local duties, levied in the towns on all goods which pass through the barriers, constitute a leading portion.

The army in 1837 consisted of upwards of 300,000 officers and men. They may be thus classified:—

Officers of all ranks, and of all portions of the staff	15,539
Subalterns, non-commissioned officers, drummers and trumpeters, soldiers not in the ranks, and children	75,835
Soldiers of all kinds, *i.e.* cavalry, infantry, artillery, and engineers	210,734
	302,108

Of general and superior officers the number was as follows:—

Marshals of France		11
Lieutenant-Generals, in active service	99	
in reserve	7	
unemployed	28	
		134
Major-Generals (*Maréchaux de Camp*), in active service	143	
in reserve	25	
unemployed	35	
		203
Colonels, Lieutenant-Colonels, and subordinate officers, to Sub-Lieutenants		567
Adjutants, Intendants, and Sub-Intendants		220
		1,135

The troops were distributed as follows:—

Infantry.—Veteran Subaltern Officers, 10 companies; Veteran Fusiliers, 23 ditto; Infantry of the Line, 67 regiments; Light Infantry, 21 ditto; Ditto in Africa, 3 battalions; Training Companies (*Compagnies de discipline*), 12 companies.

Cavalry.—Veteran Cavalry, 4 companies; Carbineers, 2 regiments; Cuirassiers, 12 ditto; Dragoons, 12 ditto; Light Dragoons (*Chasseurs*), 12 ditto; Lancers, 8 ditto; Hussars, 6 ditto; African Light Dragoons (*Chasseurs d'Afrique*), 3.

Artillery and Engineers.—Artillery, 14 regiments; Engineers, 3 ditto; Pontoon-men, 2 battalions; Training Companies, 8 companies; Pioneers, 4 ditto.

Gendarmerie in the Departments, 24 legions; Municipal Guard of Paris, 1 ditto; beside the Colonial troops.

During part of the years 1831-34 (in which last year the other powers of Europe reduced their armies), the military force of France amounted to above 400,000 men.

Of the military seminaries the Ecole Polytechnique is the most celebrated. The national guard corresponds to our yeomanry and volunteers; and as every town of consequence has a force of this description, the number of men trained to the use of arms is immense.

The French Navy, in the year 1836, consisted of the following vessels:—

Ships of the line, in service, in ordinary, or building	49
Frigates	62
Corvettes	31
Brigs	49
Gun-brigs	4
Cutters and luggers	18
Steam-boats	21
Other vessels	87
Vessels of all kinds	321

The number of superior officers at the same time was as follows:—

Admirals, and other flag-officers, not given.		
Post Captains (*Capitaines de Vaisseau*)	80	
Commanders (*Capitaines de Corvette*)	150	
		230
Lieutenants	450	
Enseignes de Vaisseau	560	
		1,010

Population, Religion, Educational Establishments, Crime.—The principal stock from which the French nation derives its origin is the Celts. At the period of Cæsar's invasion these Celts occupied nearly all the midland, western, and southern parts of the country, extending in one direction from the promontory of Bretagne to the mountains of Switzerland and Savoy, and perhaps to the frontier of the Tyrol; and in another direction from the banks of the Garonne to those of the Seine and Marne. The south-western corner of the country was occupied by the Aquitanians, whose territory extended from the Garonne to the Pyrenees: and probably some Ligurian tribes were intermingled with the Celts on the shore of the Mediterranean. Some Greek settlements occurred along that coast; and Greek blood, though in a minute proportion, has mingled in that of the modern inhabitants of Languedoc and Provence. The north-eastern parts of the country, from the Seine and Marne to the Channel and the Rhine, were occupied by the Belgians, a race probably of mixed Celtic and Germanic blood; and the immediate vicinity of the Rhine was occupied by some tribes of purer and more immediate German original. The subjugation of the country by the Romans produced an intermixture, though probably not a great one, of Romans with the natives: but it was not until the overthrow of the vast fabric of the Roman empire, and the settlement of the northern barbaric nations within its limits, that the population of France underwent any important modification. But however little the population might have been affected, the habits of the Celts had undergone material changes under the Roman dominion; and the modern French language shows how extensive and how permanent has been the influence of the Latin tongue.

At the breaking up of the Roman empire, three of the invading tribes possessed themselves of France; the Visigoths south and west of the Loire, the Burgundians in the south-east, extending from the Saône and the Rhône to the Jura and the Alps, and the Franks in the north and east. A branch of the Celtic nation, migrating from the British Isles, and differing in dialect or language from their kindred tribes in France, settled in the extreme west, and have transmitted to the present age their peculiarity of language and the name of the island (Bretagne or Britain) from which they came. Politically the ascendency of the Franks extinguished the independence of their co-invaders; but the tribes which succumbed to their yoke remained in the settlements they had acquired, and have influenced more or less the characteristics of their descendants. But notwithstanding these admixtures, the Celtæ may still be considered as the main stock of the French people; and it has been considered that the national characters of the antient and the modern race bear no inconsiderable resemblance to each other.

As the predominance of the Celtic race may be inferred from that of their adopted language in the greater part of France, so the local predominance of other tribes is indicated by that of their peculiar tongue. The Breton, an adulterated form of the language imported by the British settlers, is still the language of the rural districts and of the poorer classes in Bretagne, and is subdivided into four dialects: the Basque is yet found at the foot of the Pyrenees, and may be considered as the representative of the antient dialect of the Aquitanians: the Lampourdan, one of its principal dialects, is spoken in the Pays de Labour and in Basse Navarre. In Alsace the German language is predominant; a circumstance which may be ascribed to that province having been more completely occupied by those tribes who overthrew the Roman empire; and who have preserved their own language, and also to the long incorporation of Alsace with Germany, and its comparatively late annexation to the rest of France. The dialect of Lorraine, the adjacent province to Alsace, may be considered also as having strong affinity to that of Germany, from similar causes to those stated above.

The population of France, at the commencement of the eighteenth century, was about 19,669,320, exclusive of Corsica and part of Lorraine, which were not then united to France. In the year 1762 the population had increased to 21,769,163, inclusive of Corsica and the whole of Lorraine. In 1784 it had further increased to 24,800,000.

The population by the different census of the present century has been ascertained to be as follows:—

Census.	Population.	Increase in ten years.
1801	27,349,003	
1811	29,092,734	1,743,731
1821	30,461,875	1,369,141
1831	32,569,223	2,107,348

The predominant religion of France is doubtless the Catholic; but there is a considerable number of Protestants, especially in Alsace and in Languedoc. According to the statements of M. Balbi, more than fourteen-fifteenths of the population belong to the Catholic church; but this statement is to be received as true only upon the assumption that all are Catholics who do not worship under some dissenting form. The ecclesiastical divisions of the country have been already given. Those of the Catholic hierarchy who have the dignity of cardinal have a yearly income of about 1300*l.*; the archbishops have about 800*l.*; and the bishops about 600*l.* Of the working clergy the incomes are very small, from 20*l.* or 30*l.* to 40*l.* or 60*l.* a year: there is one in almost every commune. The number of clergy in 1836 was as follows:—

Archbishops	14	
Bishops	66	
Vicars-general	174	
Canons	660	
Curés	3,401	
Desservans	26,776	
Vicaires	6,184	
		37,275

Before the first French Revolution, the country abounded with monastic establishments for both sexes, some of them endowed with vast possessions. The abbeys and convents for men have been, with very few exceptions, abolished; and the sale of their property precludes the expectation of their being re-established. The nunneries and abbeys for women for the most part remain, and have existed throughout the Revolution, with the exception of a few years at the time of its greatest violence. The French nuns, who amount to more than 20,000, do not, except a few, lead a life of pure meditation, but are actively engaged in attendance upon the sick, or in the instruction of youth.

The Protestants are partly of the Lutheran, but chiefly of the Reformed church. The members of the Lutheran church are found in Alsace, in the capital, and in the department of Isère, a part of the former province of Dauphiné. The members of the Reformed church amount to about 1,000,000, according to M. Balbi; they constitute by far the majority of the French Protestants. They are found chiefly in the south Languedoc, and in the west, about Rochelle, once the stronghold of the Huguenots. A few Baptists are found in the Jura and the Vosges, and are remarkable for the innocence of their lives, and the simplicity of their manners. Some Jews are found in Paris, Marseille, Bordeaux, Strasbourg, Lille, Metz, Nancy, Dijon, Besançon, Montpellier, and at Winzenheim, in the department of Haut Rhin: they are calculated by some authorities at 60,000. The Catholic priests are chiefly educated in *Séminaires* established for the express purpose of clerical instruction. There is one establishment for the higher studies at Paris; and above 200 seminaries scattered throughout France. Strasbourg is the chief place of instruction for the clergy of the Lutheran church; Montauban for those of the Calvinistic or Reformed church.

The cost to the state of the maintenance of public worship, according to the budget of 1838, is as follows:—

Cost of the administration of this branch of the public service	178,500 fr.
Cardinals, Archbishops, and Bishops (Catholic)	1,017,000
Members of Chapters and Parochial Clergy (do.)	28,145,000
Royal Chapter of St. Denis	112,000
Seminaries	1,000,000
Grant (*Secours*) to Ecclesiastics and Monks	1,070,000
Maintenance of cathedral service	455,000
Building and keeping up cathedrals	1,600,000
Grants to Catholic establishments	862,000
Protestant sects' salaries	808,000
Worship of do., edifices, &c.	116,000
Jewish worship	90,000
	35,443,500

Before the Revolution, France had twenty-three universities, of which Paris was the most important, and enjoyed great privileges. The others were at Aix, Angers, Avignon, Besançon, Bourges, Bordeaux, Caen, Cahors, Dijon, Douai, Montpellier, Nantes, Orange, Orléans, Pau, Perpignan, Poitiers, Pont-à-Mousson, Reims, Strasbourg, Toulouse, and Valence. Under Bonaparte, a body was orga-

nised with the title of *Université*, which has continued with some modifications to hold to the present time the chief direction of education. Of this body, which is incorporated, and which possesses large disposable funds, arising partly from real property, partly from public grants, and partly from the payments of pupils, all public teachers are members. The highest officer of this body is the minister of public instruction, who has a seat in the cabinet; he fills up all appointments in this branch of the administration, and all vacancies in the *académies* and *collèges*, upon the recommendation however of the local authorities, by whom strict examinations are instituted. He is assisted by a council of ten members, men of the highest rank in the literary world. Twenty-six *académies universitaires* are established in different parts of France; and the whole territory is divided into as many circuits, one to each. The *académies* are at Aix, Amiens, Angers, Besançon, Bordeaux, Bourges, Caen, Cahors, Clermont, Dijon, Douai, Grenoble, Limoges, Lyon, Metz, Montpellier, Nancy, Nîmes, Orléans, Paris, Pau, Poitiers, Rennes, Rouen, Strasbourg, and Toulouse. Each *académie* consists of a rector or superintendent, who inspects all schools and places of public instruction within his circuit, and communicates with the higher authorities at Paris. He is assisted and controlled in the exercise of his functions by a council of ten members. These form the administrative portion of the *académie*. The branch of instruction, if the institution is complete in all its parts, comprehends the five faculties of theology, law, medicine, literature, and the sciences; together with a college or high-school. The preparatory instruction to the academies is furnished in the colleges or high-schools, which are established in almost all the larger towns. Paris has several *collèges*. That of Louis le Grand contained, in 1836–7, 1054 pupils; that of St. Louis 990; that of Bourbon 864; that of Charlemagne 810; that of Henri IV. 720; that of Versailles 409; that of Rolieu 390; and that of Stanislas 330. The *collège Henri IV.* is eminent for literature; the *collège Stanislas* for philosophy. The lowest grade of schools comprehends the *écoles primaires*, or elementary schools, in which France until of late years was miserably deficient.

In 1833 a law was passed ordaining that every commune by itself, or by uniting with others, should have one school of elementary instruction (*i. e.* reading, writing, arithmetic, and the legally established system of weights and measures); that every commune, the population of which exceeded 6000, should have also a school for superior instruction (*i. e.* in addition to the acquirements of the lower schools, the elements of geometry, and its application to the arts, the elements of chemistry and natural history, as applied to the ordinary habits and pursuits of life, the elements of history and geography, and more especially the history and geography of France); and that every department should have a normal school, (school for the instruction of schoolmasters,) either by itself, or by uniting with some other department. These schools are supported partly by private foundations, donations, and legacies; partly by the communal, departmental, or general government.

The state of education in 1836 was as follows:—

36,000 elementary schools for boys.
11,000 elementary schools for girls.

47,000: containing { in winter, 2,170,000 scholars. / in summer, 1,300,000 „

73 normal schools for training teachers for the elementary schools.
873 boarding-schools.
94 schools for superior instruction.
322 *Collèges Communaux*, or district high-schools, with 27,000 scholars.
41 *Collèges Royaux*, or royal high-schools, with about 15,900 scholars.

All the poor who are incapable of paying for the instruction of their children are to have them educated gratis at the schools of elementary instruction; and a certain number selected after an examination, are educated gratis at the schools of superior instruction. The masters of the elementary schools have a residence, and receive 200 francs, or little more than 8*l.* yearly salary; the masters of the superior schools have a residence and a salary of 400 francs, or above 16*l.* The whole charge to the state of the department of public instruction, according to the budget of 1838, is 19,005,673 francs, or nearly 800,000*l.*; which is thus distributed:—

	francs.
Central administration	686,623
General services	238,000
Departmental and academic administration	919,900
Superior instruction—faculties	1,972,050
Secondary instruction	1,655,600
Elementary instruction general fund	1,600,000
„ „ additional	3,500,000
Primary normal school	200,000
Literary and scientific establishments	7,676,500
Subscriptions to literary works, encouragements, indemnities collected, and publication of unedited works	557,000
Total	19,005,673

The subjoined table of the comparative state of education in France is quoted by Mr. Bulwer in his *France—Social, Literary, Political.* It states the number of those who could read and write out of 100 of the young men enrolled in 1828-29, in the military census. It furnishes data for estimating, not the present means of instruction, but the present state of knowledge among the younger part of the adult male population of France. The departments are given in the order of enlightenment.

Proportion of those who can read and write in every 100 enrolled.

1	Meuse	74	44	Gers	38
2	Doubs	73	45	Vaucluse	37
3	Jura	73	46	Ain	37
4	Haute Marne	72	47	Charente	36
5	Haut Rhin	71	48	Aude	34
6	Seine	71	49	Saône et Loire	32
7	Haute Alpes	69	50	Lot et Garonne	31
	Meurthe	68	51	Cantal	31
9	Ardennes	67	52	Pyrénées Orientales	31
10	Marne	63	53	Haute Garonne	31
11	Vosges	62	54	Aveyron	31
12	Bas Rhin	62	55	Sarthe	30
13	Côte d'Or	60	56	Loire	29
14	Haute Saône	59	57	Isère	29
15	Aube	59	58	Landes	28
16	Moselle	57	59	Vendée	28
17	Seine et Oise	56	60	Lozère	27
18	Eure et Loir	54	61	Loir et Cher	27
19	Seine et Marne	54	62	Ardèche	27
20	Oise	54	63	Indre et Loire	27
21	Hautes Pyrénées	53	64	Tarn et Garonne	25
22	Calvados	52	65	Vienne	25
23	Eure	51	66	Ille et Vilaine	25
24	Aisne	51	67	Loire Inférieure	24
25	Corse	49	68	Lot	24
26	Pas de Calais	49	69	Var	23
27	Yonne	47	70	Maine et Loire	23
28	Basses Pyrénées	47	71	Creux	23
29	Basses Alpes	46	72	Haute Loire	21
30	Nord	45	73	Tarn	20
31	Rhône	45	74	Nièvre	20
32	Hérault	45	75	Mayenne	19
33	Orne	45	76	Puy de Dôme	19
34	Somme	44	77	Arriège	18
35	Seine Inférieure	43	78	Dordogne	18
36	Manche	43	79	Indre	17
37	Loiret	42	80	Côtes du Nord	16
38	Drôme	42	81	Finistère	15
39	Deux Sèvres	41	82	Morbihan	14
40	Gard	40	83	Cher	13
41	Gironde	40	84	Haute Vienne	13
42	Charente Inférieure	39	85	Allier	13
43	Bouches du Rhône	38	86	Corrèze	12

From the above table it will appear that the north and east of France are the parts in which elementary instruction is most widely diffused; and the central and western those in which there is least.

The efforts made since 1833 to instruct the people go far to redeem France from the reproach of indifference on this head. The state of education previous to that epoch was indeed far from commensurate with the high rank held by the country in the social scale. The proportion of children at school in France was only about two-thirds of the proportion in Austria, one-half the proportion in England and Bavaria, one-third of the proportion in Prussia, the Pays de Vaud, and Wirtemberg, and one-fifth of the proportion in the United States of America. At present the proportion of scholars in France is about one-third greater than before 1833; but France is in this particular still behind Austria.

Of the extent of crime an estimate may be formed from the following data, which we borrow from the official re-

turns for the year 1834. The number of charges in that year was 5125, viz. 1557 for crimes against the person, and 3568 for crimes against property. The number of persons accused before the Cours d'Assises, which have jurisdiction in the more important criminal cases, was 6869, being in the proportion of 1 person accused to 4676, as compared with the whole population of the country. Of the 6869 persons accused, 77 were tried twice, and 3 three times, making the apparent number of accused 6952: of whom 2216 were charged with crimes against the person, and 4736 with crimes against property. The number convicted was 4164, viz. 1006 of crimes against the person, and 3158 of crimes against property: of the convicts, 25 were capitally condemned, viz. treason, 1; murder, 1; assassination, 18; parricide, 1; infanticide, 1; poisoning, 1; arson, 2; total, 25.

The number of persons accused, from the year 1828 to 1834, was as follows:—

	Crimes against the person.				*Crimes against property.*		
	Accused.	Acquitted.	Convicted.		Accused.	Acquitted.	Convicted.
1828	1765	934	831	1828	5157	1739	3418
1829	1790	956	834	1829	5579	1941	3638
1830	1666	900	766	1830	5296	1932	3364
1831	2044	1301	743	1831	5560	2205	3355
1832	1972	1041	931	1832	5593	2076	3517
1833	2135	1178	958	1833	4828	1681	3147
1834	2216	1210	1006	1834	4736	1578	3158

In fifty-seven of the departments the amount of crime was below the average of the whole kingdom: in the department of Creuse the proportion of those accused to the whole population was only as 1 to 11,538, in that of Meuse 1 to 11,235, in that of Lot et Garonne 1 to 10,202, and in that of Corrèze 1 to 10,167. The departments of the Seine (which include Paris), Pyrénées Orientales, and Corsica were those which presented the greatest proportion of accused persons: in the first the proportion was as 1 to 1191; in the second 1 to 1619; and in the third 1843. The number of men among those accused was 5793; of women 1159, being about 5 men to 1 woman: of the accused 107 were under sixteen, and 1239 between sixteen and twenty-one. There were 4080 who were unable to read or write, 2061 could read or write imperfectly, 608 could read and write well, and 203 had received instruction beyond reading and writing. The Tribunaux de Police Correctionelle, or subordinate criminal courts, took cognizance the same year of 120,108 cases, in which 172,862 persons were implicated, of whom 36,859 were women.

It is observable that the amount of crime in France is much less than in England and Wales, though the latter have not half its population; yet in the crimes of murder and rape France very far exceeds England. 'There is not,' says Mr. Bulwer, 'more than one rape or attempt to commit rape in England to every three offences of a similar description in France. There is not more than one murder or attempt to commit murder in England to every six murders or attempts to commit murder in France.' On the other hand, crimes against property are much rarer than in England.

Commercial and Manufacturing Industry.—Means of Communication, &c.—Every branch of industry in France has undergone vast improvement since the peace of 1815. The energies of the nation being turned from war to domestic employments, speedily repaired the evils which France had suffered from so long a struggle. Agriculture advanced so rapidly, that the apprehension of famine was in a few years succeeded by the cry of over-production: the race of various domestic animals which had been considerably diminished was replenished; and the manufactures were extended. These results were hastened by the disbanding of the army and the return of the prisoners of war from all quarters. From these two sources the productive population of France was augmented by 700,000 men. (Dupin's *Forces Productives de la France.*)

The woollen manufacture has increased materially: the increased quantity of wool used is partly furnished by the increased number of sheep bred, partly by the importation of foreign wool. The quality of the home-grown wool has been improved by the introduction of foreign breeds, and the Cachemire goat has been naturalised on the slopes of the Pyrenees. The principal localities of the different branches of the woollen manufacture are as follow: broadcloths are made at Elbœuf, Louviers, and Vire in Normandie; at Abbeville; at Sedan, in the ex-duchy of Bouillon; and in the south at Carcassonne, Lodève, and Castres: light woollen fabrics at Paris, Reims, Amiens, and Beauvais: hosiery at Paris, Troyes, Orléans, and at different places in Picardie, in the north of France; and in the south at Nîmes, Lyon, and Marseille: and carpets at Paris, (La Savonnerie and les Gobelins,) Abbeville, Beauvais; and at Aubusson and Felletin, (Department of Creux,) in central France: shawls are made at Paris, (the cachemire,) Lyon, Nîmes, and St. Quentin. The consumption of wool in these manufactures is probably above 50,000,000 kilogrammes or more than 1,000,000 cwts.

The cotton manufacture has increased since 1812 in a greater proportion than that of wool, and has probably tripled: the annual consumption of cotton in the different branches of this manufacture is about 30,000,000 kilogrammes, or 600,000 cwts.: and the process of manufacture and the fineness and excellence of the fabrics have undergone great improvements. The north and east of France are the chief seats of this manufacture. Rouen may be considered the Manchester of France; and Paris, Troyes, St. Quentin, and the towns of the department of the Nord, also participate largely in this manufacture. Printed calicoes are made at Rouen and Beauvais; but especially at Colmar, Mühlhausen, and other places in the department of Haut Rhin, the printed cottons of which are much approved in the German markets for the vividness of their colours (especially the Turkey-red), and their other qualities.

The silk manufacture is carried on chiefly in the south. The population of Lyon, its principal seat, had been reduced by the disasters of the Revolution and the commercial inactivity of the empire from 140,000 to about 110,000. The improvement of the silk manufacture had raised it in 1831-2 to 133,000, and it is now 150,000. The other chief seats of the silk manufacture are Nîmes, Avignon, Annonay, and Tours. Ribands are made at St. Etienne and St. Chamond, towns to the westward of Lyon. The brilliancy of the French silks has been increased by the substitution of Prussian-blue for indigo as a dye. A part of the raw silk required for these various fabrics is grown in France. The quantity of mulberry trees for the silk-worms had increased from 9,631,674 in 1820, to 14,879,404 in 1834, or more than 50 per cent. in 14 years. They are chiefly grown in the departments of Gard, Drôme, Vaucluse, and Ardèche.

Linens of the finer sort are made in Flanders, at St. Quentin, Cambrai, Valenciennes, Douai, &c.: the damask linens of St. Quentin rival those of Saxony and Silesia. Coarser linens and sail-cloth are made in Bretagne. The linen manufacture is also carried on in Dauphiné. Lace is made at Caen, Alençon, and Bayeux, in Normandie; also at Valenciennes and Douai; and in some other places.

The working of the metals has much increased, especially iron. The quantity of iron smelted in 1814 was about 100,000 tons; since 1825 it has amounted to 160,000 tons, and various utensils of this useful metal, for which France was formerly dependent on foreigners, are now produced at home. The quality and appearance of the steel and wrought-iron goods have much improved; yet the quality of the French iron is inferior, and it maintains its ground against the Russian and Swedish iron only by means of protecting duties. The principal iron-works are in the departments of the valley of the Loire, especially about Nevers, and the district of Forez about St. Etienne.

In the manufacture of clocks and watches France is almost equal to Switzerland; and for chronometers and instruments for scientific purposes it is not surpassed by any country. The inventions of the French chemists and the improvement of chemical science have done much in producing with economy and expedition the many chemical agents employed in the various branches of manufacture, and particularly dyeing.

The commoner sort of French earthenware has much improved in beauty of design. Fine porcelain is made at Sèvres, Paris, and Limoges. The cut-glass is nearly equal to that of England in beauty of workmanship, and it is perhaps superior in elegance of form.

The commerce of France is considerable: the value in round numbers of the imports for two years, the returns of which are before us, was—

	Francs.	
1834	715,000,000, or	30,000,000

Imported.

	Raw materials for manufacture.	Fit for use. Unmanufactured.	Fit for use. Manufactured.	Total.
	£.	£.	£.	£.
1834	18,187,968	5,820,377	4,799,427	28,807,771
1835	18,643,639	5,153,153	6,632,274	30,429,066

Entered for consumption.

	Raw materials for manufacture.	Fit for use. Unmanufactured.	Manufactured.	Total.
	£.	£.	£.	£.
1834	14,401,478	4,267,558	1,488,284	70,157,320
1835	15,131,950	4,052,187	1,626,684	70,810,821

Specie imported.

	£.
1834	7,696,355
1835	5,503,933

The countries from which these imports chiefly come are the United States of America, the kingdoms of Sardinia and Belgium, the United Kingdom and the British European possessions, Switzerland, the Austrian dominions, British India, Germany, Spain, and Russia. The imports from all the French colonies are not equal to those from the United States, but exceed those from any other country. The imports from England, which have much increased within these last few years, consist of linens and linen yarn; cotton goods and cotton yarn; wool, woollen yarn, and woollen goods; brass and copper goods; iron, steel, and hardwares; coals, culm, and cinders; tin, tin-plate, and tin wares; machinery and mill-work; lead, &c.

The exports at the same periods were as follow:—French merchandise alone,

	Raw Produce.	Manufactures.	Total.
1834	5,874,582	14,525,113	20,399,695
1835	6,086,603	17,009,941	23,096,544

Total Merchandise, French and Foreign.

	Raw Produce.	Manufactures.	Total.
1834	9,528,629	19,059,571	28,588,200
1835	11,233,985	22,142,202	33,376,887

Specie exported.

1834	3,891,469
1835	3,304,864

The countries to which these exports are chiefly made are the United States, the British possessions in Europe, Switzerland, the Sardinian dominions, Spain, Germany, and Belgium. The exports to the French colonies are not so great as those to the United States, to the British dominions, and to some other of the European states.

The chief articles of import are:—

Raw Materials for the Manufacturer.—Raw silk, wool, raw and dressed hemp, raw and dressed flax, cotton.

(The export of flax is nearly equal to the import.)

Manufactured Goods.—Flax and hemp, hardwares.

Metals.—Iron and steel, lead, copper, tin, gold, coined and uncoined; silver, coined and uncoined.

Colonial.—Tobacco in leaf, sugar, coffee.

Of the sugar about one-seventh is re-exported, and of the coffee and tobacco about one-half. A portion of the cotton imported is colonial produce.

Miscellaneous.—Raw hides, tallow, bones and horns, olive oil, hard woods for cabinet-ware, cheese, sulphur, wax.

The export of wax is about half the import; that of raw hides one-fourth to one-third.

The chief articles of export are as follow:—

Wine, brandy and liqueurs, salt.

Besides raw silk, wax, tallow, raw hides, wool, olive, rape, linseed, and other oil, tobacco, flax, iron, and steel and colonial produce re-exported.

Manufactured Goods.—Linens and hempen cloth, woollens, silks, cottons, hardwares, articles of fashion, besides hats, jewellery, and household furniture.

The number of ships entered inwards at ports in France in 1834—35, was as follows:—

1834.	Ships.	Tons.
French, exclusive of coasters	3965	394,486
Foreign, in direct trade to the country to which they belong	5,171	604,170
In carrying trade	953	132,748
	10,089	1,131,404
1835.		
Same classes as above.	4001	407,999
	5552	650,452
	808	115,581
	10,361	1,174,032

The number of ships cleared outwards was:—

	1834.		1835.	
French ships, &c.	4221	370,217	4292	387,139
Foreign, in direct, &c.	4217	376,503	4356	352,583
In carrying, &c.	866	141,713	838	132,224
	9304	888,433	9486	871,946

The cod fishery employed in 1836, 406 vessels of 51,915 aggregate tonnage, and 10,172 men: the whale fishery 35 vessels of 14,813 aggregate tonnage, and 1183 men. The French whale fishery has been rapidly increasing for many years past.

The means of internal communication in France are much inferior to those of Great Britain. The roads are divisible into those maintained by the central government, and designated *Routes Royales*, and those which are kept up at the cost of the several departments to which they belong, and designated Routes Départementales. Besides these there are *chemins vicinaux*, or bye-roads. The *Routes Royales* are divided into three classes. They are commonly straight, wider than our English roads; those of the first class are from 43 to 65 feet wide, and frequently planted on each side with chestnut or other large trees, forming long avenues. About one-eighth of all the *Routes Royales* are paved like a street. With the exception of a few which are carefully kept up, they are in a very bad condition, and a large outlay is required to prevent their being ruined; and in some directions the road has never been carried to its proposed termination. Those of the first class have a common point of departure, and the distances are measured from the cathedral of Notre Dame, in the heart of Paris. According to the official report, the total length of the *Routes Royales*, on January 1, 1837, was about 22,000 miles: about one-third or one-fourth are out of repair or unfinished.

Posting along the Routes Royales is strictly regulated by the government. Stations at which post-horses are kept are fixed at convenient distances. The roads are measured by distances called 'postes,' each consisting of two *lieues de poste* (post-leagues)—rather less than five English miles. The postmasters are licensed by government, and none can let post-horses without a license. The charges for posting are fixed by government. The mails are conveyed by a vehicle which is designated *malle-poste;* it carries four passengers, and is supplied with horses at the post-stations. *Diligences*, vehicles for which England supplies neither name nor resemblance, run with passengers on all the great roads. There are no tolls. The condition of the Routes Départementales, in number 1381, the aggregate length of which, on 1 January, 1837, was 23,000 miles in all states of completeness and repair, is wretched in the extreme.

The inland water communication is carried on by means of the great rivers and by the canals which have been formed. The Schelde or Escaut, the Scarpe, the Sambre, and the Aas, with the canal of Deule, 66 kilomètres, or 41 miles long, and several other canals, abundantly supply the department of Nord with the means of water communication. The canal of the Somme, 97 miles long, and the canal of St. Quentin, 58 miles long, including the former canal of Crozat, connect the port of St. Valery, at the mouth of the Somme, with the Escaut and the Oise. The navigation of the Seine commences at Troyes; that of the Aube at Arcis-sur-Aube; that of the Yonne at Auxerre; that of the Marne at St. Dizier; that of the Oise at Chauny; that of the Aisne, a feeder of the Oise, at Neufchâtel, between Rethel and Soissons; and that of the Eure at Pacy. Several canals connect the navigation of this important river system with other parts of France. The canal of St. Quentin connects the Oise with the Somme and the Escaut; the canals of Briare, 34 miles long, and of the Loing, 33 miles long, connect the Seine just below the junction of the Yonne with the Loire at Briare; and the canal of Orléans, 45 miles long, branching from the canal of the Loing, opens another communication with the Loire lower down, at Orléans. These canals were constructed 150 to 200 years since. The canal of Bourgogne connects the navigation of the Yonne, between Auxerre and Joigny, with that of the Saône at St. Jean de Lôsne, and being continued by another system of inland navigation, ultimately communicates with the Rhine; the canal of Bourgogne, which is not yet finished, though open for navigation in all its length, is 150 miles long; it follows for the

greater part of its course the valleys of the Armançon and the Ouche, feeders respectively of the Yonne and the Saône. The canal of the Ourcq, near Paris, is 58 miles long. The canal of Nivernois, connecting the Yonne with the Loire, at some point above Briare, 109 miles long, is in course of execution, and nearly finished. Le Hâvre is the chief port of export and import for the basin of the Seine.

The water communication of the western part of France consists chiefly of the navigation of the river Vilaine from Rennes, and of some smaller rivers which are navigable only for a few miles, and of three canals. The canal of the Ille and the Rance connects the Rance, a small stream which falls into the bay of St. Malo, at St. Malo, with the Vilaine, at the junction of the Ille, one of its feeders, at Rennes, and saves a tedious and dangerous navigation round the whole peninsula of Bretagne. This canal is 53 miles long: it was commenced above thirty years ago, but is only just completed. The canal of the Blavet renders the river Blavet navigable up to Pontivy. Another canal, yet unfinished, but open in part for navigation, is designed to connect Brest with Nantes, avoiding the navigation of a dangerous coast, and affording secure communication in case of a war with England or any maritime power. Its length will be 374 kilomètres or 232 miles.

The navigation of the Loire commences at Roanne in Forez; that of the Arroux below the little town of Toulon; that of the Allier above Vichy; that of the Cher at St. Aignan; that of the Indre at Loches; that of the Vienne at Châtellerault; that of the Sarthe at Le Mâns; that of the Mayenne at Laval; and that of the Loir at Château du Loir. This noble river system might be made to furnish a much more effectual outlet than it does to the produce of central France; the navigation of the great arms of the Loire is very short, (except perhaps of the Arroux, and of the Mayenne and its connected stream,) compared with their whole length. The canals connecting the Loire with the Seine have been noticed. The canal of the Centre or of the Charollois opens a communication between the Loire, near the junction of the Arroux, and the Saône at Chalons-sur-Saône. It was opened in 1791: the length is about 73 miles. A canal of the length of 199 miles is in course of execution, intended to shorten the navigation of the Loire, by avoiding the great bend which that river makes between the junction of the Allier and that of the Indre, called the Canal of Berri. Nantes is the port of the district watered by the Loire and its affluents.

The navigation of the Garonne commences at Cazères, several miles above Toulouse; that of the Arriège at Auterive; that of the Tarn at Gaillac; that of the Baise at Nérac; that of the Lot at Entraygues; that of the Dordogne at Mayronne, near Souillac; that of the Vezère, its tributary, at Montignac. The only navigable canal connected with this system is the Great Canal of Languedoc, the most important in France. It connects the Garonne, at or near Toulouse, with the Mediterranean. It follows for some distance the valley of the Lers, a feeder of the Garonne, and passing through a depression between the Cévennes and the Pyrenees follows the valley of the Aude, and the line of the coast to the sea at the port of Cette. Its length is more than 151 miles, and its large dimensions, its immense reservoir, and its numerous sluices, bridges, and aqueducts, render it one of the most magnificent canals in the world. It was opened in the reign of Louis XIV., A.D. 1681.

The navigation of the Adour commences at St. Sever; that of the Midouze, its tributary, at Mont de Marsan. The port of Bayonne is the channel for the exports and imports of the territory watered by the Adour and its tributaries.

The navigation of the Rhône is liable to interruption after it leaves the lake of Geneva: it recommences a little above Seyssel, on the frontier toward Savoy, and remains open throughout the rest of the course of the river: the navigation of the Saône begins at Seveux, between Gray and Vesoul. The canal of the Centre, which unites the navigation of the Saône with that of the Loire, and the canal of Bourgogne, which unites the Saône with the Yonne, have been noticed. The canal of Monsieur, or the canal from the Rhône to the Rhine, unites the Saône near St. Jean de Losne with the Ille, a feeder of the Rhine, just above Strasbourg. It consists of four parts: the first is from the Saône to the Doubs, above Dôle; the second consists of the navigation of the Doubs and the various cuts by which it is shortened; the third extends from the Doubs, near Montbéliard, to the Ille: the fourth part branches off from the main line near Mühlhausen, and enters the Rhine at Huningue. The length of the canal is about 217 miles. The first part was finished in 1806, the second in 1820, the fourth within the last few years. There are several canals in the flats near the mouth of the Rhône, as that of Beaucaire, 31 miles long, from the Rhône at Beaucaire by Aigues Mortes to the Sea; that of the étangs, 17 miles long, from the last mentioned canal at Aigues Mortes through the étangs or pools of Mauguio and Thau to the port of Cette, on the Mediterranean; that from the Rhône at Arles, 29 miles long, to the Port de Bouc, where the Etang de Berre opens into the sea.

Several other canals are in course of construction, of which the most important are the canal from Roanne to Digoin on the Loire, 34 miles long; that from the Sambre to the Oise, 43 miles long; that of Ardennes, 25 miles long, to connect the Meuse with the Aisne, and so with the Oise and Seine; the lateral canal of the Loire, extending along the valley of the Loire from Digoin to Briare; the lateral canal of the Oise, 20 miles long; and the canal from the Sèvre of Niort to La Rochellet, 48 miles long.

History.—Gallia, or, as we have Englished it, Gaul, was the general term by which this country was designated by the Romans. Little was known of it either to the Greeks or Romans till the time of Cæsar, who found in it the three races of Aquitani, Celts, and Belgæ, with an intermixture of some Germans, Ligurians, and Greeks: of these the Belgæ occupied the north and north-east, the Celts the western, central, and south, the Aquitani the south-western part. The Celts, who were probably the oldest race, must have settled in Gaul at an early period, as the wants of an increasing population led them, in the reign of the elder Tarquin of Rome, about B.C. 600, to send out two vast emigrating bodies, one into Italy, the northern part of which was subdued and peopled by them, and the other eastward, into Germany and Hungary. [BOURGES.] Two great countries of Germany, Bohemia (Boihemum) and Bavaria (Boioaria), derive their names from one of the tribes (the Boians) engaged in this early migration. The part of Gaul with which the Greeks formed the earliest acquaintance was the Mediterranean coast, on which they established colonies. The earliest and most important of these colonies was Μασσαλία, or Massilia (now Marseille), founded by the people of Phocæa (itself a Greek colony of Asia Minor) B.C. 600, and augmented by the emigration of the main body of the Phocæans when they sought refuge, B.C. 546, from the pressure of the Persian monarchy. The power or influence of Massilia extended over the neighbouring districts, and several colonies were founded on the coasts of Gaul, Italy, Spain, or Corsica, by its inhabitants, such as Agatha (Agde), Antipolis (Antibes), Nicæa (Nice), &c.

At the commencement of the second Punic war Hannibal marched through Gaul in his route from Spain into Italy; and Scipio, the Roman consul, who had conveyed his army by sea to Massilia to intercept him, sent a small body of cavalry up the banks of the Rhodanus (Rhône) to reconnoitre, and these had a smart skirmish with a body of Hannibal's Numidians. Hannibal however marched onward into Italy, to which country Scipio also returned, sending his army forward under his brother Cnæus into Spain.

After the close of the Punic wars the Romans gradually extended their power in Gaul. Fulvius Flaccus and his successor, Sextius Calvinus, conquered the Salyes, Vocontii, and some other tribes. The coast of the Mediterranean was now secured by the foundation of the Roman colony of Aquæ Sextiæ (Aix), B.C. 122; and that portion of Transalpine Gaul which the Romans had subdued was shortly after formed into a prætorian province (B.C. 118), of which Narbo Martius (Narbonne), colonised the following year, (B.C. 117) became the capital. Massilia, nominally in alliance with, but really in subjection to Rome, was within the province. In the migratory invasion of the Cimbri, Teutones, and Ambrones, the Roman province of Gaul was for several years the seat of war: the Roman armies were repeatedly defeated; in one dreadful battle (B.C. 104) they are said to have lost 80,000 men. The province was however rescued from the invaders by the great victory obtained by Marius (B.C. 101) over the Teutones and Ambrones near Aix. The Cimbri had marched into Italy.

The conquests of Cæsar [CÆSAR] nearly reduced the whole country between the Rhenus (Rhine), the Alps, the

Mediterranean, the Pyrenees and the ocean, into subjection to Rome. The Aquitani and the tribes who inhabited the Alps were not subdued till afterwards; the former were conquered by Messala: some of the Alpine tribes retained their independence till the time of Nero.

Under Augustus, Gaul was divided into four provinces—Narbonensis, Celtica or Lugdunensis, from the colony of Lugdunum (Lyon), founded a little before by Munatius Plancus, Belgica, and Aquitania: the limits of the last extended beyond the limits of the country of the Aquitani, being augmented by the addition of the country between the Garumna (the Garonne) and the Ligeris (the Loire). Shortly afterwards the province of Belgica was dismembered by two provinces being formed out of the districts along the Rhenus (Rhine), to which the names of provinces of Germania Prima and Germania Secunda, or of the First and Second Germany, were given: and at a subsequent period the number of provinces reached, by successive dismemberments of the larger provinces, its maximum, seventeen. We subjoin a table of the principal Gallic nations, mentioning the stock to which they belonged, and the Roman province in which they were included; adding the name of the capital of the tribe, or some remarkable town within its limits, with its modern name, which, in the case of the capital, is commonly derived from the name of the tribe rather than the original name of the town itself. This will enable the reader to identify the locality of many of the tribes.

Tribe or Nation.	Capital, or other Important Town.	Province in later Division.	Provinces according to Div. of Augustus.
I. Celtic and Ligurian Tribes.			
Volcæ—including		Narbonensis Prima.	Narbonensis.
Volcæ Tectosages	Carcaso (Carcassonne)		
Tolosates, a subdivision of the Volcæ.	Tolosa (Toulouse)		
Volcæ Arecomici	Narbo Martius (Narbonne)		
Tasconi			
Atacini (people on the river Atax, or Aude)			
Sardones	Illiberis (Elne) Ruscino (Tour de Roussillon, near Perpignan)		
Salyes, or Salluvii, (a Ligurian tribe) with a number of small tribes adjacent to them.	Massilia (Marseille) and Aquæ Sextiæ (Aix)	Narbonensis Secunda.	
Vocontii	Dea (Die)	Viennensis.	
Cavares	Avenio (Avignon)		
Tricastini	Augusta (St. Paul Trois Châteaux)		
Segalauni	Valentia (Valence)		
Allobroges	Vienna (Vienne)		
Helvii	Alba Augusta (Alps)		
Caturiges, and many small tribes	Ebrodunum (Embrun)	Alpes Maritimæ.	
Centrones, and many other small tribes	Darantasia (Moustier, in the Tarentaise)	Alpes Graiæ.	
Lingones	Andematunum (Langres)	Lugdunensis Prima.	
Ædui	Bibracte, afterwards Augustodunum (Autun)		
Dependants of the Ædui. Mandubii			
Ambarri			
Boii	Settled in the country of the Ædui in the time of Cæsar. (Vide *Cæs. de B. G.*, i. 28.)		
Segusiani	Forum, Segusianorum (Feurs in Forez) and Lugdunum (Lyon)		
Insubres			
Aulerci Eburovices	Mediolanum (Evreux)	Lugdunensis Secunda, including also the Caleti and Veliocasses Belgic tribes.	Celtica, or Lugdunensis.
Lexovii	Noviomagus (Lisieux)		
Viducasses	Viducasses (Vieux)		
Bajocasses	Arægenus (Bayeux)		
Unelli, or Veneli	Crociatonum (Valognes)		
Abrincatui	Ingena (Avranches)		
Saii, or Essui	Saii (Séez)		
Arvii	Vagoritum (Arve, on or near the river Erve)	Lugdunensis Tertia.	
Diablintes	Nœodunum (Jublins, near Mayenne)		
Aulerci Cenomani	Suindinum (Le Mans)		
Turones	Cæsarodunum (Tours)		
Andes, or Andecavi	Juliomagus (Angers)		
Namnetes	Condivicnum (Nantes)		
Redones	Condate (Rennes)		
Veneti	Dariorigum (Vannes)		
Osismii	Vorganium (Carhaix)		
Agnotes			
Corisopiti	——— (Quimper)		
Curiosolites	——— (Corseuil, near Dinan)		
Carnutes	Autricum (Chartres)	Lugdunensis Quarta, or Senonia.	
Aureliani	Genabum (Orléans)		
Parisii	Lutetia (Paris)		
Meldi	Iatinum (Méaux)		
Senones	Agedincum (Sens)		
Tricasses	Augustobona (Troyes)		
Sequani	Vesontio (Besançon)	Maxima Sequanorum.	
Helvetii, divided into four Cantons: of which two are known, and a third conjectured, and the other unknown, viz.:—			
Pagus Urbigenus			
„ Tigurinus			
„ Tugenus?	——— (Zug?)		
Rauraci	Augusta Rauracorum (Augst, in Switzerland, near Bâle)		
Bituriges Cubi	Avaricum (Bourges)	Aquitania Prima.	Aquitaniæ.
Lemovices	Augustoritum (Limoges)		
Arverni	Augustonemetum (Clermont in Auvergne)		
Vellavi	Revessio, (St. Paulien near Le Puy, in Velay)		
Gabali	Anderitum, (Javal, near Mende)		
Ruteni	Segodunum (Rodez)		
Cadurci	Divona (Cahors)		
Pictones, or Pictavi	Limonum (Poitiers)	Aquitania Secunda.	
Santones	Mediolanum (Saintes)		
Bituriges Vivisci	Burdigala (Bordeaux)		
Petrocorii	Vesunna (Perigeux)		
Nitiobriges	Aginnum (Agen)		
II. Aquitanian Tribes.			
Boii, or Boates	Boii, or Boates (Tête de Buch)	Novempopulana.	
Vasates	Cossio (Bazas)		
Tarbelli	Aquæ Augustæ (Aqs, or Dax)		
Cocosates	Cocosa		
Tarusates	Vicus Julii, or Atures (Aire)		
Elusates	Elusa (Eause)		
Ausci	Climberris (Auch)		
Lactorates	Lactora (Lecteure)		
Bigerrones	Turba (Tarbes)		
Convenæ	Lugdunum (near St. Bertrand)		
Conserani, or Consoranni and many smaller tribes	Consoranni (— in Couserans)		

Tribe or Nation.	Capital, or other Important Town.	Province in later Division.	Province according to Div. of Augustus.
III. Belgic and German Tribes.			
Caleti	Juliobona (Lillebonne, in Caux)	Included in Lugdunensis Secunda.	Celtica, or Lugdunensis.
Velocasses	Rotomagus (Rouen)		
Treveri, or Treviri	Augusta (Trèves)	Belgica Prima.	Belgica.
Mediomatrici	Divodurum (Metz)		
Verodunenses	Verodunum (Verdun)		
Leuci	Tullum (Toul)		
Bellovaci	Cæsaromagus (Beauvais)	Belgica Secunda.	
Ambiani	Samarobriva (Amiens)		
Morini	Gesoriacum, afterwards Bononia (Boulogne)		
Atrebates	Nemetacum (Arras)		
Nervii	Bagacum (Bavay)		
Veromandui	Augusta (St. Quentin)		
Suessiones	Augusta (Soissons)		
Silvanectes	Augustomagus (Senlis)		
Remi	Durocortorum (Reims)		
Catalauni	Durocatalaunum (Chalons sur Marne)		
Nemetes	Noviomagus	Germania Prima, or Superior.	
Tribocci	Argentoratum (Strasbourg)		
Vangiones, and many smaller tribes	Mogontiacum (Mayence)		
Menapii		Germania Secunda, or Inferior.	
Batavi	Lugdunum Batavorum (Leyden)		
Eburones, in whose country settled the			
Tungri	Atuatuca (Tongres)		
Toxandri			
Ubii, and many other tribes.	Colonia Agrippina (Cologne)		

In the decline of the Roman power Gaul was ravaged by the Franks, the Burgundians, and the Lygians (who had been all driven out by Probus, A.D. 277); by the Bagauds, a body of peasants, themselves Gauls, driven into rebellion A.D. 284, 285, by the weight of their oppressions, and the distress consequent on the ravage of the barbarians and the civil dissensions of the empire; again by the Franks and the Allemans, who were repulsed by the emperors Julian (A.D. 355 to 361) and Valentinian (A.D. 365 to 375), and by the piratical Saxons who ravaged the coasts. The Roman power still sufficed to keep these barbarians from settling in Gaul; it could not however abate the constant pressure on the frontier; and the decaying strength of the empire only protracted, but could not avert the final catastrophe.

The Franks (*i. e.* the freemen) were a confederacy of German nations, the Salians, the Bructerans, the Ripuarians, the Cauci, the Cherusci, the Chamavi, the Catti, the Tencteri, and the Angrivarians. These tribes preserved their independence while confederated, and each had its king. Like the Saxon chieftains who professed all to derive their lineage from Woden, the Frankish princes claimed a common ancestor, Meroveus, (*Meer wig*, warrior of the sea,) from whom they bore the title Merovingians. The æra of Meroveus is not ascertainable. In the fourth century the Franks were settled on the right bank of the Rhine from the junction of the Mein or Mayn to the sea, and in the latter part of that century and during a considerable part of the next appear to have been in alliance with the empire. The Allemans dwelt on the same bank of the Rhine from the Mayn upwards.

Upon the downfal of the Roman empire, Gaul became a prey to the barbarous nations by which the empire was dismembered. There was no revival of national independence as in Britain. The nationality of the Gauls had been lost, when the extension of the right of Roman citizenship to all the natives of the provinces by Caracalla, A.D. 212, merged the distinction previously maintained between the conquerors of the world and their subjects; and the national religion, Druidism, had sunk beneath the edicts of the emperors and the growing influence of Christianity.

On the last day of the year 406, the Rhine was crossed by a host of barbarians who never repassed that frontier stream. They consisted of Vandals, Alans, Suevians, Burgundians, and other nations. The Vandals, who first reached the bank, were defeated by the Franks who defended, as the allies of the empire, the approach to the frontier; but on the arrival of the Alans, the Franks in their turn were overcome, and the passage was effected. The devastation of Gaul by this horde of invaders was terrible: the inhabitants of many towns were slaughtered or carried into captivity, the sanctity of the churches was violated and the open country laid waste. Armorica (the present Bretagne), into which the settlement of the British soldiers who had followed Maximus the usurper into Gaul [Bretagne] had infused a military spirit, assumed and established its independence; but the rest of Gaul became a prey. The Suevians, the Alans, and the Vandals crossed the Pyrenees into Spain: the Burgundians settled, with the sanction of the Roman government, in the east of Gaul, on both sides of the Jura, and on the west bank of the Rhine, from the lake of Geneva to the confluence of the Rhine and the Moselle; and the Visigoths, who had been long ravaging both the eastern and western Empires, were induced, just before the settlement of the Burgundians (A.D. 412 to 414), to accept the cession of that part of Gaul which lies to the south and west of the Loire. Toulouse was their capital. Both Burgundians and Visigoths took the name of Romans, and professed subjection, which was however merely nominal, to the emperor of the West. The lands in the districts ceded to them were divided between the original possessors and the new comers, who gave up their unsettled migratory course of life upon receiving a permanent interest in the soil.

Hostilities were before long renewed between the troops of the Empire and these new-settled nations; but their settlement opportunely supplied Gaul with the means of defence against a fresh invasion. In A.D. 451, Attila, king of the Huns, with an immense host of barbarians, passed the Rhine at or near the confluence of the Neckar, destroyed Divodurum or Mediomatrici (Metz), and Atuatuca or Tungri (Tongres), and besieged Genabum or Aureliani (Orléans). Ætius, the Roman general, supported by the Visigoths and the Burgundians, and numbering in his ranks Franks, Saxons, Alans, and other barbarians, advanced against Attila and obliged him to raise the siege and retire towards the frontier. At Durocatalaunum, or Catalauni (Chalons-sur-Marne), a battle was fought in which victory was doubtful, but which was attended with a dreadful slaughter of his forces, and induced Attila to evacuate Gaul.

During these events, the Franks had attracted little notice: their subdivision into tribes weakened their power, and perhaps their fidelity to the Empire restrained them from pressing it with their attacks. They retained their possessions on the right bank of the Rhine; but had obtained by concession or conquest some settlements on the left bank or along the banks of the Escaut or Schelde and the Meuse. In the invasion of Attila some of their tribes marched under the banners of Ætius, while others attached themselves to the invading host.

It was not until the reign of Clovis, who commenced his career as king of the Salians, one of the Frankish tribes settled at Tournay, about A.D. 481, that the Franks assumed a commanding position. The Empire of the West had now fallen, and Italy was under the government of the Ostrogoths; but a relic of the Empire remained in Gaul; and the territory in which the patricians Ægidius and his son Syagrius upheld the name of Rome was between the possessions of the Visigoths and Burgundians and the settlements of the Franks. This territory was among the early conquests of Clovis (A.D. 486). He then defeated the people of Tongres, and (in A.D. 496) subdued a portion of the Allemans, who had made an inroad into Gaul: the conquered people recognised Clovis as their king; his opportune conversion to Christianity advanced his popularity and his power in Gaul, as well as his profession of the faith in what was deemed an orthodox form, while all the other princes who shared among them the once extensive territories of the Empire were the supporters of Arianism or some other form of doctrine that was looked upon as heretical.

The sway of Clovis extended from the banks of the Lower

Rhine, the cradle of his power, to the Loire, the Rhône, and he Ocean, for Armorica had submitted to him. He now determined, on the pretext of uprooting Arianism, a plea which was calculated to secure him numerous supporters beyond his own confines, to attack Alaric II., king of the Visigoths, whom he defeated and slew at Vouglé in Poitou. The Burgundians hoping to share in the spoils of the conquered nation, supported Clovis; but the Ostrogoths of Italy supported the Visigoths and prevented their entire subjection. A large part of their territory, including Bordeaux and Toulouse, and extending perhaps to the foot of the Pyrenees, fell into the hands of Clovis; but the Visigoths preserved the coast of the Mediterranean, together with Spain, which they had conquered: the Ostrogoths had Provence, and their king Theodoric held the sovereignty of the Visigoths also as guardian of their king, his grandson Amalric. The assassination of the various Frankish kings by Clovis rendered him undisputed head of the tribes of his own nation, and his sovereignty extended over Gaul, with the exception of the parts retained by the Ostrogoths, Visigoths, and Burgundians. Clovis may be considered the real founder of the French monarchy: he died A.D. 511.

The death of Clovis brought on the dismemberment of a monarchy which had been established too short a time for consolidation. The four sons of Clovis had each his share of the regal inheritance. Thierri became king of Austrasia (Champagne, Lorraine, Luxembourg, and the left bank of the Rhine as low as Cologne); Clodomir, king of Orléans (Maine, Anjou, Touraine, Orléanois, Nivernois); Clotaire, king of Soissons (Picardie, the Netherlands, and part of the Ile de France); and Childebert, king of Paris (comprising the rest of the monarchy). But though the sovereignty was divided, the nation was regarded as one, and all the kings claimed their thrones by virtue of descent from Clovis. The Franks now first invaded Italy, though without success; but their power was increased by the subjection of the Burgundians and the cession of Provence to them by the Ostrogoths: and ultimately the dismembered monarchy of Clovis was reunited, together with these accessions, under Clotaire, the youngest of his sons. Under the successors of Clotaire, France was again repeatedly divided and reunited: it is needless to describe changes which it is difficult to trace and to remember, and which left no other permanent effects than the weakness of the nation and the decline of the kingly power. The various divisions bore the names of Austrasia, which comprehended the eastern and north-eastern parts of France, Flanders, the Rhenish provinces, and part of Switzerland; Neustria, which comprehended the north-western parts of France; Aquitaine, the country south and west of the Loire; and Bourgogne, the remainder of France and Switzerland, with some parts of Savoy. The Merovingian kings, the descendants of Clovis, ceased with Childeric III., who was deposed A.D. 752; but the kingly power had already come into the hands of the hereditary dukes of Austrasia, Pepin l'Heristal, Charles Martel, and Pepin le Bref; while the governors of provinces had acquired all but absolute independence of the crown.

The accession of Pepin le Bref to the crown, upon the deposition of Childeric III., reanimated the spirit and power of the Franks. Pepin waged war with the Saxons and with the Saracens, who had possessed themselves of the coast of the Mediterranean, which he wrested from them; and the subjugation of the duchy of Aquitaine reunited the empire of Clovis with new acquisitions in the hands of Pepin, who reigned A.D. 752—768; but the splendour of his achievements faded before the superior glory of his son Charlemagne, who extended his power over Italy, except the southern part, then held by the Greek emperors, and over the greater part of Germany. His reign (in conjunction with his brother Carloman, A.D. 768-771; alone, 771-814) was distinguished by the attention which he paid to the revival of letters. [CHARLEMAGNE.] But the fabric of empire which he had raised fell to pieces under the less vigorous sway of his son and successor (A.D. 814-840) Louis le Débonnaire.

In the confused history of the Carlovingian princes, successors of Charlemagne, it is difficult to trace the events which belong to France, or to separate its annals from those of Italy and Germany. [CHARLES II., *Le Chauve*; CHARLES III., *Le Gros*; CHARLES III., *Le Simple*.] Divisions and subdivisions of the Frankish empire took place; and the wars of rival princes, and the degeneracy of the descendants of Charlemagne delivered up France a prey to the ravages of the Northmen or Normans, who acquired possession as a fief of the crown, by cession from Charles le Simple (A.D. 911), of the territory subsequently known as the Duchy of Normandie. The governors of provinces established an hereditary authority in their several governments: the cities, destitute of protection from the government, declined in wealth and population, and in many cases lost their municipal rights and privileges; the number of serfs or villains increased, and the mechanic arts were exercised by the slaves of the great lords. The power of Hugues le Grand, count of Paris, surpassed that of the later Carlovingian kings, and on the death of Louis V. the Carlovingian dynasty expired, and a new family was called to a sovereignty little more than nominal, in the person of Hugues Capet, son of Hugues le Grand, who was elected by his army and consecrated at Reims, A.D. 987.

From the time of Hugues Capet the history of France is less involved: the crown descended with tolerable regularity to the son or other successor of each deceased king, and the divisions and reunions of the parts of the kingdom ceased. The kingly power was indeed feeble; but it gradually acquired strength, and the royal domain (as distinguished from the domains of the great feudal lords) was progressively enlarged by the conquest, forfeiture, inheritance, or acquisition by other means of the greater fiefs.

The following chronological table of the kings marks the principal extensions or diminutions both of the regal domains and of the kingdom at large; and those changes which form the characteristics of the periods in which they occurred. For particulars the reader is referred to the articles on the several kings. [CHARLES; PHILIPPE; LOUIS; &c.]

(987.*) HUGUES *Capet*, son of Hugues le Grand, count of Paris.

The condition of the kingdom at the accession of Hugues is thus described by Sismondi: 'We have designated two long periods of the history of the French by the names of the two races of kings, the Merovingians and the Carlovingians, who first held the government of France. A third period begins with the consecration of Hugues Capet at Reims, the 3rd July, 987; a period which cannot, without impropriety, take its name from the new race of the Capetians: it is a period in which royalty was, as it were, annihilated in France, in which the bond of society was broken, and the country which extends from the Rhine to the Pyrenees and from the channel of the Manche (the English Channel) to the Gulf of Lions was governed by a confederation of princes rarely under the direction of one common will, and only kept together by the feudal system.

'While France was confederated under the feudal regime, the legislative power was suspended in it Hugues Capet and his successors, to the accession of St. Louis, had not the right of making laws; the nation had no diet, no regularly constituted assemblies the authority of which was recognised by it. The feudal system, silently adopted, and obtaining consistency and extension by custom, was the only system recognised by the numerous potentates who divided the provinces among themselves. It held with them the place of the social bond of the monarchical and legislative power.'

The accession of Hugues however increased the power and domain of the crown by the addition of that domain which he had possessed while yet a subject. He was duke of France, count of Paris and Orléans, and abbot of several rich monasteries: a number of lords held their possessions under him by the feudal tenure; and he had the support of the duke of Bourgogne, his brother, and of the duke of Normandie, his brother-in-law. Yet he was not acknowledged as king in Guienne till A.D. 990; and Limousin did not acknowledge his right till the reign of his successor.

These two nobles, the dukes of Bourgogne and Normandie, the latter especially, were among the most powerful of the French lords: and of the rest the principal were, the count of Champagne, the count of Vermandois, (part of whose inheritance passed to the counts of Blois, and elevated them to a degree of consideration which they had not previously possessed,) the count of Flanders, the count of Anjou, the count of Poitou and duke of Aquitaine, the count of Toulouse; and, though at a somewhat later period, the duke of Bretagne. The six paramount feudatories, who afterwards became exclusively peers of France, were, the dukes of Bourgogne, Normandie, and Aquitaine, the counts of Flanders, Champagne, and

* The figures within parentheses are the years of accession.

Toulouse. The vassals of Hugues, as count of Paris and Orléans, made such approaches to independence, that, at his death, the authority of his successor extended little beyond the walls of Paris and Orléans.

(996.) ROBERT, son of Hugues Capet, born A.D. 970.

(1031.) HENRI I., son of Robert, born A.D. 1005.

(1060.) PHILIPPE I., son of Henri I., born A.D. 1053.

The power of the first four Capetian kings was very small, and the kingdom over which their nominal sovereignty extended was not co-extensive with modern France; Lorraine Transjurane Bourgogne, and Provence were subject to the imperial crown. Their reigns constitute the æra of the rise of chivalry. The reign of Philippe I. was marked by the conquest of England by William of Normandie. The communes or municipalities of France originated in leagues of the inhabitants of towns for defence against baronial oppression, formed in the reign of Philippe, though commonly ascribed to the reign of his successor. Philippe was engaged repeatedly in hostilities with the Anglo-Norman kings, William I. and William II. The first crusade took place in Philippe's reign, and by exhausting the power of the nobles prepared for the emerging of the regal authority from its depressed condition.

(1108.) LOUIS VI., *Le Gros*, son of Philippe I., born A.D. 1078.

The reign comprehends an important period in the history of the French, whether by the progress of the people in the communes, the rights of which had scarcely received at this epoch their first legal sanction; or by the progress, not less marked, of the central authority in the power of the crown, which, instead of remaining unnoticed, as under Philippe I., between the Seine and the Oise, began really to make itself felt from the Meuse to the Pyrences; or, lastly, by the development in the same interval of the feudal system. This system profiting by the progress of intelligence and the study of other systems of legislation, acquired a regularity and authority which no one dared any longer to dispute with it. The activity of Louis vindicated his authority in his own domains, which had by this time been considerably extended, and enabled him to struggle with the Anglo-Norman and other great princes of his kingdom, and to extend the jurisdiction of the crown.

(1137.) LOUIS VII., *Le Jeune*, son of Louis *Le Gros*, born A.D. 1120.

The king carried on the policy of his father, of establishing his authority in his own domains. He married Eléonore of Guienne, from whom he was afterwards divorced. She subsequently married Henry Plantagenet, afterwards Henry II. of England: this marriage made the power of Henry superior to that of Louis: he had Normandie, Anjou, Maine, Touraine, Poitou, Limousin, Angoumois, Saintonge, Berri, Marche, part of Auvergne, Guienne, and Gascogne; but his quarrels with Becket and with his sons prevented his availing himself of his superiority. Louis *Le Jeune* was personally engaged in the second Crusade, but he met with no success.

(1180.) PHILIPPE II. *Auguste*, son of Louis VII., *Le Jeune*: born A.D. 1165.

The predominance of the Anglo-Norman power united the other great vassals of Philippe more closely in alliance with the crown; and the exhaustion of the Anglo-Normans from their civil dissensions, from the Crusades, the heavy ransom of Richard I., *Cœur de Lion*, and the weakness of John, enabled Philippe to raise the power of the crown above that of his puissant vassals. Philippe displayed considerable warlike activity: he was engaged in the third crusade 1189—91, in conjunction with Richard *Cœur de Lion*, and in hostilities with Richard and John, and with the emperor Otho, whom he defeated at Bouvines, near Lille, A.D. 1214. He united Normandie, Maine, Anjou, Touraine, and Berri, to the domain of the crown; increased the previously small domain of the crown in Auvergne, and other parts of the south of France; and consolidated the regal power by substituting constitutional forms for individual caprice. This reign was marked by the blood-stained Crusades against the Albigéois [ALBIGENSES] in the south of France, which weakened the power of the count of Toulouse who protected the Albigéois. France, in its present extent, was at this time divided between four sovereign princes—the king of France; the Emperor, who held the provinces of the east and south-east; the king of England; and the king of Aragon, who had considerable territories near the Pyrenees and the Mediterranean

(1223.) LOUIS VIII., *Cœur de Lion*, son of Philippe Auguste, born A.D. 1187.

Louis conquered Poitou, and engaged in the crusade against the Albigéois.

(1226.) LOUIS IX., (*St. Louis*,) son of Louis VIII., born 1215.

(1270.) PHILIPPE III., *Le Hardi*, son of St. Louis, born A.D. 1245.

(1285.) PHILIPPE IV., *Le Bel*, son of Philippe *Le Hardi*, born A.D. 1268.

(1314.) LOUIS X., *Le Hutin*, son of Philippe *Le Bel*, born A.D. 1289.

(1316.) JEAN I., a posthumous son of Louis *Hutin*, lived only three or four days.

(1316.) PHILIPPE V., *Le Long*, second son of Philippe *Le Bel*, born A.D. 1294.

The accession of Philippe established the Salic law: he was preferred to the daughter and heiress of his elder brother, Louis *Le Hutin*.

(1322.) CHARLES IV., *Le Bel*, third son of Philippe *Le Bel*, born A.D. 1295.

The direct line of the Capetian kings ended with Charles IV.

The reign of St. Louis, one of the most equitable and virtuous of princes, and the reigns of his successors, some of them as remarkable for the opposite qualities, are marked by the consolidation of the power of the law as distinguished from that of arms. This beneficial change was however accompanied under the successors of Louis with the most revolting acts of injustice under the forms of law. Many of the nobles were despoiled of their fiefs; the order of the Templars was extinguished in the blood of its members; the Jews and Lombards grievously oppressed; and trade ruined by the abasing of the coinage. Persecution assumed a more systematic form by the establishment of the inquisition at Toulouse. In this period the greater part of Languedoc was added to the domains of the crown, which were considerably augmented in other places.

COLLATERAL BRANCH OF VALOIS.

(1328.) PHILIPPE VI., *de Valois*, born A.D. 1293, grandson of Philippe *Le Hardi*, by his third son Charles of Valois.

(1350.) JEAN II., *Le Bon*, son of Philippe *de Valois*, born A.D. 1319.

(1364.) CHARLES V., *Le Sage*, son of Jean II. *Le Bon*, born A.D. 1337.

The reigns of these three kings are marked by the wars of the English in France under Edward III., who claimed the throne of France in the right of his mother, and his son the Black Prince. The French were defeated in the great battles of Sluys (naval) A.D. 1340, Crécy, A.D. 1346, and Poitiers 1356. But the premature infirmity of Edward III. and the death of his son, who had at one time received the cession of a large territory in the south-west of France, under the title of the principality of Aquitaine [BORDEAUX], caused the downfal of the English power, and tended ultimately to the extension of the domains of the French crown.

(1380.) CHARLES VI., *Le Bien Aimé*, son of Charles *Le Sage*, born A.D. 1368.

(1422.) CHARLES VII., *Le Victorieux*, son of Charles VI., born A.D. 1403.

The reigns of these two kings were marked by another desperate struggle with the English under Henry V. and his successor Henry VI. At one time the success of the English was so decided that Henry V. was recognized as heir to the throne of France, to succeed on the death of Charles VI.: but the perseverance and spirit of the French ultimately triumphed, and of all their splendid domains in France the English monarchs retained only Calais. This was a period not only of foreign invasion, but of civil dissensions and of the most frightful massacres and assassinations. The dukes of Bourgogne, who descended from a younger son of JEAN II., were acquiring a vast territory and great power.

Charles VII. was the first to substitute a standing army for the military service of the feudal vassals.

(1461.) LOUIS XI., the first entitled *Le Roi Très Chrétien*, son of Charles VII., born A.D. 1423.

Louis, a crafty and intriguing prince, did for France what Henry VII. did for England in breaking down the feudal system. Upon the death of Charles *Le Téméraire*, duke of Bourgogne, he seized a portion of his inheritance [BOURGOGNE.] The domain of the crown was now become

very extensive, though parts of Picardie in the north, Bretagne in the west, several parts of Gascogne in the south, Limousin, Perigord, Auvergne, Bourbonnois, Orléanois, and several districts of the centre were not included.

(1483.) Charles VIII., son of Louis XI., born A.D. 1470.

In him ended the direct succession of the house of Valois.

Branch of Valois Orleans.

(1498.) Louis XII., *Le Père du Peuple*, born 1462, descended from a younger son of Charles V., *Le Sage*.

Branch of Valois Angouleme.

(1515.) François I., *Le Père des Lettres*, descended from the same stock, born 1494.

In the reign of this prince the arts, commerce, and literature began to revive. The domains of the crown were augmented by several additions, as of Auvergne and Bourbonnois in the centre, parts of Picardie in the north, and parts of Gascogne in the south; and virtually of Bretagne in the west; if indeed we may not rather ascribe this last acquisition to the reign of Louis XII.

(1547.) Henri II., son of François I., born A.D. 1519.

In this reign the French reconquered Calais and its territory, the last relic of the English possessions in France. [Calais.]

(1559.) François II., eldest son of Henri II., born A.D. 1544.

(1560.) Charles IX., second son of Henri II., born A.D. 1550.

(1574.) Henri III., third son of Henri II., born A.D. 1551.

The reigns of the last two princes were distinguished by the religious wars of the Catholics, at the head of whom were the dukes of Guise, of the family of Lorraine, and the Huguenots under the Prince of Condé and Admiral Coligny [Coligny], afterwards under Henri of Navarre.

The dreadful massacre of St. Barthélemi [Bartholomew Massacre, The St.] was perpetrated by the Catholics who formed the celebrated Confederation of the League, at the head of which were the Guises. The court, which had previously supported the Catholics, was driven by the fear of this powerful and ambitious family to an alliance with the protestants, and Henri III. perished by the hand of a Catholic assassin A.D. 1589. In him ended the direct succession of the branch of Valois Angoulême.

Branch of Valois Bourbon.

(1589.) Henri IV., *Le Grand*, born A.D. 1553, descended from Robert, count of Clermont, younger son of St. Louis, and brother of Philippe III., *Le Hardi*.

In the reign of Henri IV. the resources of France were so far developed that the country began to assume that station in European politics to which its territorial extent, population, and social improvement entitled it. A fairer prospect seemed to be opening to the rulers of that country. The earlier kings had to struggle with the spirit and the institutions of feudalism; and when, at the close of the direct line of the Capetians, the predominance of the law over the armed violence of feudalism seemed to be gaining consistency and strength, the accession of the house of Valois brought on the struggle between the kings of France and England for the right and possession of the crown. The excesses of the disbanded soldiery, the struggles of the contending factions (the Bourguignons and the Armagnacs), and the rising of the commons of Paris and of the peasantry or *jacquerie*, as they were termed, were added to the ravages of the enemy; and when, after more than a century, the contest terminated in the almost entire expulsion of the English, the kings of France had to watch or struggle with rivals of almost equal strength in the dukes of Bourgogne, and the other nobles whose power, the result of the feudal system, still survived when the spirit of the system was gone. The reviving strength of the crown and the kingdom under Charles VIII., Louis XII., and Francis I., was repressed by the rising power of Spain and the ascendency of the imperial house of Austria, and exhausted by the unsuccessful attempts made to gain possession of Italy. Then came the ascendency of the house of Lorraine, and the wars of religion which desolated France for thirty years. At length however the exhaustion of the Lorraine party, or 'The League,' and the opportune conversion of Henri IV. to the Catholic faith, restored peace. The French frontier was now advanced to the Pyrenees, except on the side of Roussillon, which alone remained to the Spaniards of their possessions in Languedoc; and the districts, such as the Nivernois and Auvergne, over which any of the nobility retained territorial sovereignty, were of little importance when compared with the royal domain, now augmented by Bearn, and the other portions of Henri's patrimony. The generous disposition and popular manners of Henri acquired for him the love of his people; and the wisdom of Sully, his chief minister, promoted the prosperity and husbanded the resources of the country. Henri granted to the Protestants the enjoyment of many important rights and privileges by the edict of Nantes, A.D. 1598, and was more desirous of improving the condition of his people than of extending his frontier by foreign conquest.

(1610.) Louis XIII., *Le Juste*, son of Henri IV., *Le Grand*, born A.D. 1601.

Cardinal Richelieu, the minister of this prince, had in view to crush the nobility, to humble the Protestants, and to set bounds to the power of the house of Austria. His attempts to humble the Protestants led to a renewal of the religious wars: the duke of Rohan and his brother, the prince of Soubise, were at the head of the Protestant party but their talents were exerted without success: the court triumphed, and the Protestants lost the towns which they held as securities: the edict of Nantes was not however revoked. To abase the house of Austria, Richelieu supported the Protestants of Germany in the 'Thirty Years' War;' but however his talents may have animated and directed the allies, the French armies obtained little distinction until the next reign.

(1643.) Louis XIV., *Le Grand*, son of Louis XIII., *Le Juste*, born A.D. 1638.

The minority of this prince was marked by the dissensions and hostilities of the courtiers and powerful nobles, and by the splendid success of the French armies under the prince of Condé and the marshal Turenne. The dissensions of the nobles so weakened their power, that the king was enabled to assume and exercise a more despotic power than any of his predecessors had possessed. The nobility were reduced to be the mere dependents on the court; their titles descended to all their children, and a noble held the pursuit of commerce, and even of the liberal professions, to be a degradation: the country was burdened by the expenses of a court which had such a body of retainers, and the privileges and exemptions from taxation, which the nobility possessed, and other relics of the feudal system were among the principal causes of the French Revolution. The despotism of Louis XIV. then, however splendid in appearance, prepared the way for the overthrow of the crown in the person of his descendant, next but one to himself in the possession of the throne.

The military successes of the French in this reign were splendid, except near the close, when the arms of the coalition against France, under the guidance of Marlborough and Eugene, gained the ascendant. The boundaries of France were however considerably enlarged in this and the preceding reigns by the addition of Roussillon, Artois, part of Flanders, Franche Comté, and Alsace: the boundaries of France thus became nearly what they are at present. The manufactures and trade of France made considerable progress in this reign under the able management of Colbert.

(1715.) Louis XV., *Le Bien Aimé*, great-grandson of Louis XIV., *Le Grand*, born A.D. 1710.

The long reign of Louis XV. presents little worthy of notice except the changes in the public mind which were preparing the overthrow of all the antient institutions of the kingdom; and the increasing dilapidation of the finances. These circumstances, with the gross sensuality of the king, and the disputes of the Jesuits with the Jansenists, and of the clergy and the crown with the parliaments or courts of justice, all tended more or less to prepare the way for great changes.

In this reign Corsica was added to France; the last relics of the feudal sovereignties, the Duchies of Lorraine and Bar, and the principality of Dombes, were added to the domain of the crown. Le Comtat d'Avignon and le Comtat Venaissin remained in the hands of the pope.

(1774.) Louis XVI., grandson of Louis XV., *Le Bien Aimé* born A.D. 1754.

In this reign the catastrophe, which had been long preparing, took place. The French Revolution is an event too complicated for us to attempt to trace its history; all we can do is to mark some of the chief organic changes, and the

principal accessions to or diminutions of the territory of France. Among the more immediate causes of the Revolution were the financial embarrassments of the government, and the enthusiasm for liberty inspired by the alliance of France with the United States, in the struggle of the latter for independence against the power of Great Britain.

1787. *The Meeting of the Notables*, a number of persons from different parts of the kingdom, chiefly selected by the king. The *Notables* were dissolved the same year.

1789. *The States General*, the antient assembly of the kingdom, consisting of the deputies of the nobles, clergy, and of the *Tiers Etat* (third estate) or commons, assembled.

The deputies of the *Tiers Etat*, with such deputies of the clergy as chose to join them, (none of those of the nobility accepted the invitation) voted themselves the supreme legislative body, under the title of the National Assembly.

In this year the division of the kingdom into departments was introduced.

1790. Hereditary nobility and titles of nobility were abolished.

1791. A new constitution was promulgated by the Assembly;—France was declared a limited monarchy.

1791. The Legislative or National Assembly assembled according to the new constitution.

1792. The royal authority was suspended by the National Assembly: the nation was invited to elect a national convention, and determine on the form of the government. The convention assembled and proclaimed a republic.

1793. Louis XVI. was executed: the nominal reign of his son Louis XVII. (born 1785) commenced.

1793. The constitution of the republic was completed; but it was determined that the Convention should continue in power till the end of the war.

1795. A new constitution was substituted for that of 1793, which was found to be impracticable. The executive power was confided to a body of five, called the Directory. Two legislative bodies, the Council of Antients and the Council of Five Hundred, were constituted. The nominal king, Louis XVII., died.

1799. The Constitution was remodelled: the Directory was overthrown: consuls for a term of years were appointed; Bonaparte, Siéyes, and Ducos, provisionally: then Bonaparte, Cambacères, and Le Brun.

1802. Consuls for life were appointed—Bonaparte, Cambacères, and Le Brun.

1804. Napoleon assumed the sovereign power as Emperor.

During these changes the boundaries of France were continually extending.

The chief acquisitions, with the dates at which they were made, and the departments into which they were formed, are as follow:—

When acquired.	Departments and Capital.
1789. Le Comtat d'Avignon and Le Comtat Venaissin.	Vaucluse. *Avignon.*
This acqusition is still retained.	
1796. Principality of Montbéliard,—incorporated with	Doubs.
1798. Free territory of Mülhausen,—incorporated with	Haut Rhin.
These acquisitions are still retained.	
1801. The Austrian Netherlands and all that part of Germany which is on the left bank of the Rhine.	Mont Tonnere. *Mayence.* Sarre. *Trèves.* Forêts. *Luxembourg.* Rhin et Moselle. *Coblenz.* Sambre et Meuse. *Namur.* Ourthe. *Liège.* Roer. *Aix la Chapelle.* Meuse Inférieure. *Maestricht.* Jemmapes. *Mons.* Dyle. *Bruxelles.* Deux Nethes. *Anvers.* Escaut. *Gand.* Lys. *Bruges.*
1801. Porentruy (Switzerland)—incorporated with	Haut Rhin.
„ Geneva and Chambéry, with the surrounding districts.	Mont Blanc. *Chambéry* Léman. *Genève.*
„ County of Nice.	Alpes Maritimes. *Nice.*
1804. Piedmont and Liguria.	Doire. *Irrée.* Sésia. *Verceil.* Marengo. *Alexandrie.* Po. *Turin.* Stura. *Coni.* Montenotte. *Savone.* Gênes. *Gênes* (*Genoa*). Apenins. *Chiavari.*
1807 to 1811. The Ionian Isles.	
Territories on the right bank of the Rhine.	Bouches de l'Elbe. *Hambourg.* Bouches du Weser. *Brême.* Ems Supérieure. *Osnabruck.* Ems Orientale. *Aurie.*
Holland, or the United Provinces.	Ems Occidentale. *Groningue.* Lippe. *Münster.* Frise. *Levarde.* Yssel Supérieure. *Arxheim.* Bouches de l'Yssel. *Zwol.* Zuyderzée. *Amsterdam* Bouches de la Meuse. *La Haye.* Bouches du Rhin *Bois le Duc.* Bouches de l'Escaut. *Middlebourg.*
Duchy of Parma.	Taro. *Parme.*
Tuscany.	Méditerranée. *Livourne* (*Leghorn*). Arno. *Florence.* Ombrone. *Sienne.*
Part of the States of the Church and other districts in Italy.	Rome. *Rome.* Trasimène. *Spoleto.*

But these acquisitions were lost upon the overthrow of Napoleon, with the few exceptions which we have marked in the course of our enumeration.

(1814.) Louis XVIII., brother of Louis XVI., born A.D. 1755.

The Charter was granted in 1814 by this king.

(1824.) Charles X., brother of Louis XVIII., born A.D. 1757.

The second Revolution broke out A.D. 1830.

Collateral Branch of Orleans.

(1830.) Louis Philippe, previously duke of Orléans, descended from a younger brother of Louis XIV., born A.D. 1773.

State of France before the Revolution.—The population of France previously to the Revolution was politically divided into three classes, called *états*, or states—the clergy, the nobility, and the commons, or *tiers état*.

The clergy, as a political body, was divided into the old French clergy, and the foreign, that is, those belonging to the provinces which had been united with France since the reign of Henry the Second. The income of the whole clerical body was estimated by Necker, in his 'Administration des Finances,' at 130 millions of livres, and the proportion of their real property to that of the other landowners as 1 to 5¼. The share of the parish clergy in this income was estimated by the same author at from 40 to 45 millions of livres. The abbeys, except those which were the chief seats of some monastic orders, as, for instance, the Grande Chartreuse, near Grenoble, and the Great Cistertian Convent at Citeaux, near Dijon, were in the gift of the king, and part of them were granted to real ecclesiastics and part to the *Abbés commendataires*. Of these latter there were 225, and some of them very rich. The *Abbés commenda-*

taires received the third part of the income, but were under no obligation either to reside in or to submit to the regulations of the convent, the duties of which devolved on the prior. These ecclesiastical benefices were employed as sinecures for the younger sons of the nobility, and only the poorer of them were occasionally bestowed on learned and deserving clergymen who were not born among the privileged classes. The number of regular abbeys or monastic establishments was 368, of which 115 were convents and 253 nunneries. The contribution of the clergy to the general revenue of the country was the tithe established under Francis the First, and called from the first revising commissioner, Paschal, *Décime Paschaline*. But as this contribution, as compared with the wealth of the clergy, was very small, that body granted regularly every five years the so-called *dons gratuits ordinaires*, amounting from 15 to 18 millions of livres; and occasionally also *dons gratuits extraordinaires*. These latter however were not donations, but only loans without interest, which were repaid after a long time. The so-called foreign clergy were in some provinces subject to the general taxes. There was a good deal of relaxation of discipline and corruption of manners among the clergy, which, united with the anti-religious spirit which at that time pervaded all France, had rendered the clergy an object of hostility to the other classes of society. Still it is only fair to state that many French priests, particularly among the parish clergy, exhibited the most perfect examples of the Christian virtues, and bore the severe trials to which they were exposed by the French Revolution with a fortitude worthy of their profession, although sometimes not without a tinge of fanaticism and superstition.

The nobility of France was quite differently constituted from that of this country, where the eldest son inherits the title of his father, and the other children fall into the general class of commoners, and become merged in the great mass of the population. The French noblesse was exceedingly numerous,* for not only all the children of a noble belonged to the class of their father, but that class was continually increased by the creation of new nobles. There were about 4000 offices or places in the country which conferred nobility, either simply by being obtained, or by being held for the space of twenty years. Almost all these places were acquired by purchase. Besides, there were frequent creations of nobles by royal patent. The nobility possessed great privileges: they were exempted from the land-tax (*taille*), the military service, the statute labour for the maintenance of roads (corvée), and many other duties and taxes. They were subject, it is true, to the capitation tax; but this tax, when compared with the land-tax imposed on the unprivileged class, was a mere trifle. The nobility, the clergy, and some orders, as, for instance, that of the knights of Malta and of St. Lazarus, possessed by far the greatest portion of the landed property in France, and enjoyed in their domains many feudal rights, some of which, although trifling in their object, as, for instance, the exclusive right to keep pigeons and rabbits, were the source of great vexation to the peasants. Personal servitude was finally abolished in many parts of France only a few years before the Revolution. Although the nobility enjoyed all the above-mentioned privileges as a body, there was a great difference between the old and new nobles, the latter being held in a very slight estimation by the former. Only such nobles as could prove that their families had been ennobled for 300 years, or at least 200, had any consideration.

The highest class, as we might suppose, consisted of those whose origin was lost in the darkness of past ages. Only those who belonged to the old noblesse had access to the court as a birthright; and even in the reign of Louis XVI. there appeared an *ordonnance* which required a man to prove four generations of nobility in order to become an under-lieutenant. Every regiment had a colonelship *en second*, which was reserved for young noblemen of the first families, who thus began their military career with a grade which others could attain only after long service. Many ecclesiastical benefices were exclusively reserved for the younger sons of nobles. Besides the great mass of untitled noblesse, there were dukes, marquises, counts, viscounts, and barons; but except those who bore the first of those titles, they were not distinguished among themselves by any special privileges. Only the dukes had peculiar privileges at court, of which the principal was that their wives were allowed to sit on a tabouret in the presence of the queen.

The third class of the inhabitants of France comprehended the whole population, except the nobility and clergy, and constituted somewhat more than $\frac{19}{20}$ parts of the whole. Siéyes stated in 1789, in a few words, the condition of the *tiers état* and its claims: 'Qu'est ce que le tiers état? Tout! Qu'a-t-il été jusqu'à present? Rien! Que demande-t-il à être? Quelque chose!' This definition contains all the secret of the French Revolution. The *tiers état* included before the Revolution all the inhabitants, from the richest merchant and the most eminent scholar, to the poorest peasant and the meanest artizan. The lower part of the *tiers état* were crushed by the burden of a most injudicious taxation, the weight of which pressed almost exclusively on them. This was rendered still more intolerable by the oppression of the land-owners or their agents, and by the grossest abuses of the manorial jurisdiction. A consequence of all this was the greatest misery among the people, and a deeply-rooted hatred towards the higher classes, which manifested itself in the terrible acts of revenge and bloodshed which accompanied the Revolution in France. While the lower part of the *tiers état* was ground down by what we may term physical oppression, the higher part of that class was suffering under a moral depression no less galling to their feelings. Wealth and intellect, the two most natural means towards attaining distinction, were unavailing to a man who had not the advantage of birth, and the road to honours and preferment was closed against him. Even a great number of the new nobles were in the same situation, for although they legally possessed the same rights with the other nobles, they were virtually prevented from enjoying them by the old families, who carefully excluded the new intruders upon their privileged class from all honours and preferments.

The revenue was derived from direct and indirect taxation. The direct taxation consisted—1st, of a land-tax called *taille*, levied only on the lands belonging to the non-privileged classes; 2nd, the capitation, to which all classes were equally subject; 3rd, a property tax, principally assessed on lands which being originally one-twentieth of the net income, was called *vingtième;* it was afterwards doubled, and called *les deux vingtièmes*. This tax was augmented by a third vingtième, which was imposed not as a permanent but only as a war-tax. The nobility were not legally exempt from the above-mentioned property-tax, but by their influence they contrived to have it assessed in such a way that they were very slightly affected by it. The whole amount of revenue derived from direct taxation immediately before the Revolution was 210,000,000 of livres, of which the non-privileged class contributed three-fourth parts, although they owned scarcely one-third part of the soil of France. Besides these unequally assessed taxes, the peasants were exclusively subject to a statute labour for the maintenance of public roads called *corvée*, the value of which Necker estimated at 20,000,000 livres annually. Another heavy burthen on the non-privileged classes was military quarters: they were obliged to furnish the soldiers gratuitously not only with lodgings, but also with fire, candles, salt, and washing; and wherever the cavalry was quartered in the country, the inhabitants were also obliged to furnish the horses with forage. This class was also exclusively subject to compulsory military service, and 60,000 men were drawn by lot for the army every year.

The indirect taxes were still more oppressive than the direct, and their assessment was of the most preposterous character. They consisted—1st, of customs levied not only on goods imported from abroad, but on those which passed from one part of France to another, the country being divided into three compartments on account of many provinces enjoying privileges and exemptions which the others did not; 2nd, of the monopoly of snuff and tobacco; and 3rd, the monopoly of salt. This last gave birth to a kind of oppression unparalleled in the annals of fiscal tyranny, and it ought to be recorded for its monstrosity. All France was divided, with respect to the salt trade, into six districts:—1. The *Provinces Franches* (Bretagne and a part of Poitou), where salt was not taxed, and could be purchased for its market price, about two livres for the quintal. 2. The *Provinces Redimées*, comprehending the rest of Poitou, Guienne, and Auvergne, which had purchased their exemption from the salt monopoly in the reign of Henry II. for 1,700,000 livres. These provinces

* It is generally supposed that there was one noble in every 250 persons.

supplied themselves from the sea salt-works of Saintonge and Poitou, and although they paid an import duty, they could get the quintal of salt for a price varying from 6 to 10 livres. 3. The Lower Normandie, which produced sea-salt, of which it had formerly given the fourth part to the government, and was called on that account *Pays du Quart Bouillon*. This salt-tax in kind being afterwards converted into a pecuniary tax, raised the price of that commodity to 13 or 15 livres for the quintal. 4. The *Pays des Salines*, which were furnished from the salt-mines of the interior, and which comprehended Alsace, Lorraine, Franche Comté, and the bishoprics of Toul, Metz, and Verdun. These districts got salt at the unequal prices of 12, 15, 27, and 36 livres for a quintal. 5. The *Pays des Petites Gabelles*, or Provence, Languedoc, Lyonnais, and Dauphiné, which received salt from the salt-works on the sea-coast, and paid for the quintal from 22 to 40 livres. 6. The *Pays des Grandes Gabelles*, comprehending almost all the inland provinces of Northern France, or about one-third of the whole country. These districts paid the heaviest duties on salt, and two-thirds of the whole revenue from that source was raised from them. In these districts the price of salt varied from 54 to 62 livres the quintal.

A consequence of this oppressive and unequal taxation on salt was a general contraband trade in that indispensable commodity, which could not be put down either by a numerous preventive service, or by the heavy punishments inflicted on the smugglers. There were generally about 1800 individuals in prison for such offences, and a year was considered fortunate when there were no more than 300 persons sent to the galleys for smuggling salt. All these severities proved useless against so lucrative a business as salt smuggling; for it was calculated that an individual could gain in one hour, by transporting over the frontier of a province two pounds of salt in his pocket, more than a hard-working labourer could earn in a day. The oppression caused by this system of taxation was increased by the custom of farming out the indirect taxes to individuals or companies, who paid the government a stipulated sum, which they endeavoured to get back with a profit from the inhabitants, whom they oppressed in the most unsparing manner.

Besides the above-mentioned taxes, the country suffered greatly by the absurd policy which prohibited the exportation of corn not only from France, but even in many cases from one part to another. This restriction was introduced by Colbert as a means of favouring manufactures by ensuring cheap provisions; but what was only a financial error of that statesman became the source of the greatest abuses under his successors. The intendants, without whose permission corn could not be exported from their respective districts, sold that permission to capitalists, who raised the price of corn and resold it at an enormous profit to the government, which endeavoured to maintain an equal price of bread all through the country. It is no wonder that agriculture suffered under such a bad system, and that great dearths often occurred. Turgot succeeded in partly abolishing the barriers which obstructed the corn trade, and after the year 1774 it was free, at least in the interior of the country. But agriculture could not be easily raised from its depressed state; and as the regular supply of the metropolis always remained an object of considerable difficulty it was easy to alarm the inhabitants of Paris with a dearth; a measure which was employed in bringing about the first scenes of horror in the Revolution, and exciting the Parisian mobs against the royal family.

The revenue extorted from the people by this system of taxation was squandered in the most profligate manner. The wars of Louis XIV., the splendid edifices erected by him, and the pomp of his magnificent court, although supported by oppressive taxation, had at least the advantage of flattering the national vanity; but the wanton prodigality of Louis XV. and of his favourites, Madame Pompadour and Madame Dubarri, was without the same excuse. It was under the reign of Louis XV. that a new custom was introduced into the public accounts, which became the source of and the pretext for the grossest abuses. We allude to the *acquits à comptant*, or receipts signed by the king himself for monies received by him: those sums were never actually received by the king; and the receipts were only used as the means of concealing in the official accounts the real employment of the revenues. Louis XVI. was by no means a spendthrift, and the memory of the unfortunate Marie Antoinette has been recently vindicated against the reproach of prodigality; but the habit of lavishing public money was too deeply fixed in the court and the system of government to be eradicated. The *acquits à comptant*, or, as they were afterwards called, *ordonnances au porteur*, were continued under the reign of Louis XVI. The sums drawn by these means from the public treasury amounted, from 1779 till 1787, to 860 millions of livres: the whole of which, with the exception of secret service money for foreign affairs, was given in pensions or expended in grants to the court noblesse. These favours were lavished without any discrimination, and the courtiers, who could not invent a pretext for asking a grant or a pension, used to propose to sell to the king some property or privilege, for which they received the desired sum. Sixteen millions of livres were expended in two years in paying the debts of a prince of the royal family; and the notorious Beaumarchais received for secret services a million livres at once.

The royal power which had been long limited by the feudal institutions gradually became absolute. The meeting of the states general (*états généraux*) had been discontinued since 1614. Some provinces, as Artois, Bretagne, Languedoc, &c., had their provincial states, which were composed of the deputies of the nobility, clergy, and *tiers états;* all their powers however consisted in making the assessment of the taxes in order to raise the quota of the general revenue which was required of these provinces. This circumstance was the cause of the different systems of taxation in the several provinces, which were particularly injurious by having produced the various customs to which we have already alluded. The provinces were governed by royal intendants, of whom there were 32 possessed of extensive powers. The municipal institutions, which were flourishing in France during the middle ages, were almost entirely abolished, and the offices of towns were generally either hereditary or acquired by purchase. A few towns preserved their antient institutions by paying to the treasury the sum which would have been derived by the sale of the municipal offices in each city, and elected their magistrates and public functionaries. At Paris the king nominated the *prévost de marchands*, who was the chief municipal officer of the town; the city elected 4 aldermen (*échevins*), and the places of 26 municipal counsellors and of 16 chiefs of quarters of the town were hereditary.

The central administration of the country was conducted by the chancellor of France and the secretaries of state for foreign affairs, war, marine, and the royal household, and the comptroller general or general director of the finances. Each of these functionaries, although not always enjoying the rank of a real minister or having access to the council of state, had uncontrolled power in his own department. Their orders were issued in the name of the king, and with the royal signature; the king however did not sign himself, but the minister stamped the royal signature and countersigned it with his own name. The *lettres de cachets*, or arbitrary orders by which the ordinary course of justice was interfered with, were issued only by the ministers of the royal household. The ministers were not appointed by any written document, but became invested with their powers by a simple invitation from the king to assist at the council of state. They could not be deprived of their places without a formal condemnation, and it was therefore almost indispensable to exile a minister from the capital in order to dismiss him. The king himself presided in the council of state, and the ministers delivered their reports to him. There was also a council of dispatches for foreign affairs, a council of finance, and a privy council of war: all the ministers and secretaries of state sat in those councils. There was another council of state composed of *conseillers d'état* and *maîtres des requêtes*, in which the chancellor of France, or the keeper of the seals, presided. This was a kind of judicial body which decided on appeals from the supreme courts. There was also a tribunal called *grand conseil*, composed of 5 presidents, 54 counsellors, and some other minor functionaries, which decided questions about ecclesiastical benefices, bankruptcy, and various other matters. The chancery, or *grande chancellerie*, was composed of the chancellor, two *grands rapporteurs*, two *grands audienciers*, and several minor officers. It prepared the appointments to public places, patents of nobility, legitimations, naturalizations, &c. The number of functionaries, high and low, employed in the various branches of administration

was enormous. Necker states that the number of officers employed only in the collection of the property and land-tax, and of the customs, was 250,000.

The inferior courts of justice were the manorial courts, *justices seigneuriales*. The manorial or seignorial jurisdiction was divided into the high, middle, and low, the first of which had jurisdiction in criminal cases. An appeal was sometimes allowed from the *seigneur bas justicier* to the *seigneur haut justicier*, but generally it was made to the royal tribunals called *baillages* and *sénéchaussées*, whose authority extended not only over the royal demesnes, but also in certain extraordinary cases, called *cas royaux*, which the manorial courts were not competent to decide, over private estates. The tribunals of some large cities were called *présidials*, and were composed of a president and at least six counsellors, who all acquired their places by purchase. The supreme courts of justice were called parliaments. The highest was that of Paris, being the most antient (established in 1302), and having the largest district subject to its jurisdiction, which comprehended almost half of France. It was composed of the first president, 9 presidents of the *grande chambre*, 8 presidents of the other 4 chambers, and 116 *conseillers*. It had attached to it a host of subalterns, procurators, advocates, &c. The nine presidents of the *grande chambre* wore a kind of round cap, whence they were generally called *présidents à mortier*. The other parliaments were at Toulouse (established 1444), Grenoble (1453), Bordeaux (1462), Dijon (1476), Rouen (1499), Aix (1501), Rennes (1553), Pau (1620), Metz (1632), Besançon (1674), Douay (1686), Nancy (1753). All these parliaments claimed to be considered as forming one body; but the government never acknowledged that claim: as the parliaments decided in the last resort, they assumed the appellation of *Cours Souveraines*, and in consequence of that sovereignty claimed some peculiar rights. The government had no direct influence over the parliaments; it could neither nominate nor dismiss any of their members, all offices in the parliaments being acquired by purchase, and considered by those who were invested with them as their lawful property which they could sell to others. This notion of property was so strong that even those magistrates who forfeited their places by any malpractices retained the right of selling them. These judicial functions became in progress of time vested in a certain number of families, which formed a separate class of nobility called *Noblesse de Robe*, or nobility of the gown. The parliaments presented a most perfect specimen of a close self-elected corporation, which exercised a terrible despotism over the country, and from which it was almost impossible to obtain redress. They often deviated from the letter of the law, and decided according to what they called the rules of equity—a mode of proceeding however which seems not to have been much relished by the public, as it gave rise to frequent protestations in the provinces and to the French proverb—*Dieu nous garde de l'equité du parlement*. The parliaments were invested with great power in criminal cases, and the punishment of death could be inflicted by them on very slight proofs of guilt; indeed there are many well-known cases of most iniquitous sentences by them, as for instance that of Calas, of Lally, &c. Civil process before the parliaments was slow, overloaded with useless forms, and very expensive. The salaries of the judges were trifling, but they received fees. Their pay was determined by the number of daily attendances (*vacations*) employed on any case. For each *vacation* there were paid to a conseiller 19¼ livres; and he frequently claimed for 200 or 300 such *vacations*. The first president was supposed by a legal fiction to be present at every transaction of the parliament, and he accordingly received his *vacations*, or daily fees. It was reckoned that the last president but one of the parliament of Paris, M. d'Aligre, a greedy man, contrived to receive, from 1768 to 1783, the daily fees of 400 years. Such incomes, united with the advantage of high consideration, and all the privileges of nobility, rendered places in the parliament very desirable: the office of a counsellor generally cost 60,000 livres, and that of the first president of the parliament of Paris 500,000 livres.

The edicts of the government were formally registered in the parliamentary records; but this was a mere formality, and the parliaments could not prevent a royal edict from being carried into effect by their remonstrances.

The decrees of the parliament were frequently annulled by the council of state, in which the chancellor presided. The government also frequently interfered with the ordinary course of justice by the *lettres de cachets*, by which people were arbitrarily imprisoned, exiled, and sometimes screened from the arm of justice.

There were at Paris, as well as in many parts of France, tribunals for auditing the public accounts, which were called *cours de comptes*. Other tribunals, called *cours des aides*, decided in all cases of financial administration; and that of Paris enjoyed great popularity, as it constantly took the part of the people against the extortions of the farmers of the revenue and treasury officers. All the places in the above-mentioned tribunals were purchased like those in the parliaments.

For further particulars about the state of France before the Revolution, see *Considérations sur le Gouvernement de la France*, par le Marquis D'Argens; and *Histoire des Français des divers Etats aux Cinq derniers Siècles*, par Monteil; also *Histoire de la France pendant le 18me Siècle*, par Lacretelle.

Historical Sketch of the French Language and Literature. First period—From the establishment of the French monarchy to Francis I.—The dominion established in Gaul by the Romans ultimately destroyed the antient languages of the country. It is also probable that the Greek colony of Massilia (Marseilles), established about six centuries before our æra, had diffused in some parts of southern France the use of the Greek tongue. No monuments of the poetry of the Celts of Gaul have reached us, although we may conjecture that they had one similar to that of the Scottish Gaels. Under the Roman dominion Latin became the general language of the country, which produced many writers in that tongue, such as Ausonius, Sidonius Appollinaris, Salvianus, Sulpicius Severus, &c., &c.

The invasion and settlement of Germanic nations in Gaul produced a corruption of the Latin by the admixture of foreign idioms. The influence of the Visigoths, who established themselves in the southern provinces, was however, in respect to language, not considerable, and their northern idiom was soon absorbed by the Latin. Yet this Latin, which, except among the educated, had probably never been spoken with great purity by the population of Gaul, became still more corrupted by the admixture of a foreign race, and degenerated into a peculiar idiom called the *Romanzo*, or *Lingua Romana Rustica*. This idiom became not only the language of France, but of many other parts of southern Europe, where the barbarians of the north established their dominion on the ruins of the Roman empire.

The conquest of Gaul by the Franks hastened the corruption of the Latin tongue. The conquerors however seem for a long time to have preserved their native tongue; as the council of Tours, held in 813, recommends the bishops to translate their homilies into two languages, the Roman and the Theotisk, or German. The same injunction was repeated at the council of Arles in 851.

It appears that the separation of the German from the Roman language dates from the division of Charlemagne's empire among the sons of Louis the Débonnaire, when the German part of it became separated from France. The most antient monument of the French Romanzo is the oath of Louis the Germanic, son of Louis the Débonnaire, on the occasion of a treaty with his brother Charles the Bald of France, concluded at Strasburg in 847. The German monarch took the oath in Roman, and the French in Teutonic.

The Romanzo of France had a variety of idioms, according to the provinces where the influence of the invaders was more or less exercised. These were however but shades, and the language of France in general could be divided into two principal idioms, separated by the Loire. These were called respectively from their affirmatives, the southern the *Langue d'Oc*, and the northern the *Langue d'Oïl* or *d'Oui*.

The *Langue d'Oc*, or as it was frequently called the *Occitanian language*, is better known under the appellation of the *Provençal*, as the rulers of Provence united at the beginning of the twelfth century under their dominion the greatest part of southern France.

The Provençal language was rather formed by a modification of Latin words, than by the admixture of foreign words and idioms. Many favourable circumstances united with the beautiful climate of those countries to promote the early development of a poetical literature in the Occitanian language. The poetry of Provence was not like the northern,

of a melancholy and meditative character, but rather of a sprightly and animated tone; and it bore the appropriate name of the merry science, *Gaya Ciencia*. It was cultivated by the Troubadours, who spread its glory over all Europe. [TROUBADOURS.] (Sismondi, *Histoire de la Littérature du Midi de l'Europe;* and Raynouard *on the Language and Poetry of Provence.*) The dialect of northern France, or the *Langue d'Oui*, although formed like the *Langue d'Oc* from the Latin, had a greater admixture of the Germanic element. It underwent still greater changes, owing to the establishment of the Normans in France at the beginning of the tenth century. The first authors who wrote in the *Langue d'Oui* were descendants of Normans, who introduced the romance of chivalry. This kind of composition was originally a versified chronicle, which though often founded on facts was disfigured by the most extravagant fictions. Robert Wace, an Englishman educated in Normandy, who lived at the court of Eleanor of Aquitain, mother of Richard Cœur de Lion, wrote the *Brut d'Angleterre* about the middle of the twelfth century. He is also the author of the celebrated *Roman de Rou*. Many other romances were written about that time. Their principal theme was king Arthur, and his Knights of the Round Table. The exploits of Charlemagne and the Crusades are also the subject of many romances; and some of them are founded on antient history, for instance the romance of 'Troy,' written about 1170, by Benoit St. More; and the celebrated romance of 'Alexander,' written in the beginning of the thirteenth century, which is the origin of the Alexandrine verses of twelve syllables which are still used by modern French writers. (*Corps d'Extraits de Romans de la Chevalerie*, par Tressan; Dunlop's *History of Fiction;* and Huet, *de l'Origine des Romans.*)

The poets who wrote in the Langue d'Oui were called *Trouveres*, and like their namesakes of Provence, the Troubadours, reckoned among their body several persons of high rank, such as Thiebaut, count of Champagne, and king of Navarre (1201-53), who imitated with great success the poets of Provence. His poems were published in 1742 at Paris, under the title 'Poesies du Roi de Navarre,' 2nd edit. 1821. Another kind of poetry which belongs to this period is the Fabliaux, or tales, which are partly of oriental origin, and were imported by the Crusaders into Europe. They are generally written in verse, and sometimes alternately in verse and prose. They often contain a great deal of wit and fun, but are also frequently disfigured by a coarse licentiousness. The poets of other countries have borrowed from them, and Boccaccio has largely drawn from this source. A fine edition of the Fabliaux, printed from the manuscripts of the Royal Library, was published by Barbazan in 1756, 3 vols.; and a new edition of the same collection in 4 vols., by Meon, 1808, and in 2 vols. 1823. The most entertaining of these Fabliaux were translated into modern French by Legrand d'Aussy, and published in 1779 under the title of 'Fabliaux, ou Contes du 12me et 13me Siècles;' a new edition by Raynouard appeared in 1829.

The persecution of the Albigenses, whose tenets were embraced by many of the Troubadours, plunged the south of France during the thirteenth century into an abyss of misery, and destroyed the literature of Provence. The Troubadours, who had spread the glory of the language of Provence disappeared for ever, and the language itself sunk to the condition of a patois, or country dialect. Divided into many dialects, it is still spoken over all the south of France, and is the idiom of a part of western Spain, extending from Figueras to Murcia, as well as of the populations of Sardinia and the Balearic Islands; but in all those countries the educated classes have adopted the Castilian, Italian, and French. This decline of the Occitanian language on the one hand, and on the other the establishment of the seat of government for France and of a university at Paris, rendered the northern dialect, or the *Langue d'Oui*, the predominant language of all France.

The 15th century gave birth in France to a kind of allegorical and satirical poetry, of which the most remarkable specimens are the *Roman de Renart* and the *Roman de la Rose*. The former is the well-known story of 'Reinard the Fox,' and is the same popular tale as the German *Reinecke der Fuchs*. It is still a matter of discussion among the learned whether the original of this story belongs to the German or the French. This subject was treated by different French authors of that period; by Pierre de St. Cloud about 1233, and by Jacquinard Gielée of Lille about 1290, in the *Roman du Nouvel Reynart*. The appellation of *Roman* was then given to every book written in the Roman or common idiom instead of Latin, which was at that time the learned language. The *Roman de la Rose* is perhaps the most celebrated French production of the middle ages. It is a kind of didactic allegorical poem, which professes to teach the art of love, and embraces the most varied subjects. It is a very extraordinary mixture of divinity and profane science. It contains passages of St. Thomas Aquinas and Ovid's 'De Arte Amandi.' There are Nero, Virgil, Samson, Dalila, Zeuxis, Jason, Pygmalion, and many other personages biblical, historical, and mythological, intermingled with allegorical beings, as lady nature, false appearance, &c. This work was begun by Guillaume de Lorris, who wrote the first 4150 verses, and it was completed in 1280 by Jean de Mean or Mehan. It contains 22,000 verses, and was considered in France for three centuries as a masterpiece; and even as late as the beginning of the 17th century there were persons in France who compared it with the *Divina Commedia* of Dante. It created two parties, one of which attacked it as violently as it was defended by the other. The *Roman de la Rose* has gone through many editions, the last of which by Meon appeared at Paris, 1814, in 4 vols. There appeared about the same time many other allegorical poems of minor importance; the principal writers were Dans Helynaud, Guillaume Deguilleville, Jean du Pin, and Gaston Count de Foix.

Among the poets of the fourteenth and fifteenth centuries are the celebrated annalist Froissart and Charles duke of Orleans (died in 1466), whose poems excel those of his contemporaries in tenderness and depth of feeling. Being taken prisoner at the battle of Azincourt, he remained a captive in England for twenty-five years—a circumstance which will account for the melancholy strain of his poems: they were published at Grenoble in 1805. Clotilde de Surville, whose works were published for the first time in 1803, has produced a good deal of controversy among the critics of France, and may be considered as the greatest poet of that period. Olivier Basselin (1350—1418), the merriest poet of his day, was by profession a fuller in Lower Normandy: the almost unvarying theme of his songs is wine and cider. As he lived in the valley of Vire, called *Val* or *Vau de Vire*, where a mill called Basselin is still in existence, his songs received the appellation of *Vau de Vires*, which is the origin of the term *vaudeville*. Alain Chartier, secretary of Charles VI. and Charles VII., was an insipid poet, but he enjoyed in his time a considerable reputation. Villon, a man of low birth, who spent his life with robbers and thieves, created a popular poetry in France. We may also mention Charles Bordignée, author of the 'Légende de Pierre Faifeu,' or French 'Owl Glass;' Pierre Michault, and Martial D'Auvergne.

The subject of the FRENCH DRAMA is discussed under ENGLISH DRAMA. Poetry preceded prose composition in France as it did everywhere else. The poetical productions designed for the amusement of the people were written in the vulgar idiom; but prose works, being of a more serious nature, as legends of the saints, chronicles, legal enactments, ordinances of the church, &c. were written in Latin. There were, however, at an early date some rude attempts at writing French prose. The clergy composed works in French on religious subjects; nobles wrote upon the chase and tournaments, &c. The versified Romans of chivalry were also sometimes rendered into prose. The most remarkable productions in prose of this period are 'Memoirs,' a kind of literature peculiar to the French, and the commencement of which dates from the thirteenth century. These first historical productions in the French language were written by men engaged in active life, who related what they had themselves experienced and observed; and they therefore felt the necessity of abandoning the language of poetry to express themselves in that of common life. The poetical language of France, owing to the continued imitation of the Troubadours, remained stationary for several centuries, while the common language advanced with the progress of the national civilization. This circumstance established a considerable difference between the poetical and prose languages of France; and it explains the fact of romances which were originally written in verse being afterwards frequently reduced to prose. For the same reason too the prose of the thirteenth century is nearer to the present French than the poetry of the fifteenth. The characteristics of these old memoirs are simplicity united

with piety and a ceremonious courtesy. The first of these memoir-writers was Geoffroy de Ville Hardouin, who left a remarkable description of the capture of Constantinople by the French and the Venetians, in which he had himself a share. He was surpassed by Jean de Joinville, senechal of Champagne, who accompanied St. Louis in his first crusade, 1248. He describes the events of that crusade with great talent in his 'Histoire de St. Louis.' Christine de Pisau, daughter of the astrologer of the court of Charles V., wrote her memoirs about 1400. Olivier de la Marche described under the reign of Louis XI. what had befallen him during the troubles under Charles VII.

The best historian of France during the middle ages is Philippe de Comines, and the most entertaining is Froissart. Guizot has published an excellent collection of French memoirs, entitled 'Mémoires relatifs à l'Histoire de France jusqu'au 13me Siècle,' 29 vols., Paris, 1823. A continuation of Guizot's collection was published by Petitot under the title 'Collection complète de Mémoires relatifs à l'Histoire de France depuis le Règne de Philippe Auguste jusqu'au Commencement du 17me Siècle' (First Series, 52 vols., Paris, 1819). The second series of this collection appeared in 56 vols., Paris, 1820, under the title 'Collection des Mémoires relatifs à l'Histoire de France depuis l'Avénement de Henri IV. jusqu'à la Paix de Paris conclue 1763.' Both these collections were completed by the chronicles published by Buchon, in 46 vols., Paris, 1824, under the title 'Collection des Chroniques nationales Françaises écrites en Langue vulgaire du 13me au 16me Siècle.'

Period 2nd, from Francis I. to Louis XIV. (1515—1643.) The French literature of the middle ages, although rude, has the merit of being truly national; it bears the stamp of the French character, and gives an image of the civilization of those times. It certainly contained the seeds of a great development; and had the French writers of the sixteenth century followed the track of their predecessors, the literature of their country would have been really a national one, and something very different from what it is now. Under Francis I. the study of the Greek and Roman authors began to spread in France; and the French writers, dazzled with the hitherto unknown beauties of the classical writers, despised the works of their forefathers and attached themselves to the imitation of the antients. The national recollections, as well as the ideas introduced by Christianity, were replaced by the history and mythology of antient Rome and Greece; and thus arose the so-called modern Classical school—that which, instead of imitating the antients, derived its materials from national elements, has been designated by the appellation of Romantic. Besides a slavish imitation of the antients—which in fact was a false rather than a true imitation of them—another still greater defect corrupted the French literature under Francis I., but produced its most debasing effects under Louis XIV.: we mean that degrading flattery manifested more particularly by the poets towards the court and the great, and which they probably acquired by studying the base adulations of the writers of the Augustan age. Until the time of Louis XIV. this new kind of literature encountered some resistance from the national opinion and even from some writers; and the political and religious struggle which disturbed France during that period—from 1515 to 1643—had its counterpart in the literature of the same time.

Among the poets of this period is Francis I., who, notwithstanding his numerous faults, possessed the undoubted merit of promoting the literature of his country. He wrote poetry of a light description, which is by no means devoid of ease and grace. Francis's sister Marguerite of Valois, queen of Navarre, is well known by her attainments and literary labours. Mary queen of Scotland, who was educated in France and married to Francis II., composed some beautiful verses; and Henry IV. indulged himself, not unsuccessfully, in poetical effusions.

Among the authors of the reign of Francis I. Clement Marot deserves the first place, and next to him the learned Etienne Dolet of Orleans, who was burnt as a heretic. Louisa Labé was a skilful writer of elegies. The influence of the classical literature produced a new poetical school in France, whose leader was Ronsard, an author long extolled far above his merits, but now perhaps too much despised. The other principal writers of the same school were Jodelle [ENGLISH DRAMA], Etienne Baif, Joachim Dubellay, and Guillaume Du Bartas. Maturin Regnier wrote satire with considerable success; and Passerat obtained distinction by the satire 'Menippé,' which he wrote in conjunction with the learned lawyer Rapin against the Ligue. French poetry began to be purified from the admixture of Græcisms and Latinisms, with which the school of Ronsard, and particularly Du Bartas, had infected the language, by Des Roches, Jean Bertaut, and Desportes. But the merit of creating a new epoch in French poetry, particularly in improving its versification, undoubtedly belongs to Malherbe, of whom Boileau says with justice,—

> 'Enfin Malherbe vint, et le premier en France
> Fit sentir dans les vers une juste cadence.
> D'un mot mis en sa place enseigna le pouvoir,
> Et reduisit la muse aux règles du devoir.
> Par ce sage écrivain la langue reparée,
> N'offrit plus rien de rude à l'oreille épurée.
> Les stances avec grace apprirent à tomber,
> Et le vers sur le vers n'osa plus enjamber.
> Tout reconnut ses lois; et ce guide fidèle
> Aux auteurs de ce temps sert encore de modèle.

Racan (1589—1670), one of the first members of the French Academy, which was founded in 1635 by Richelieu, and a pupil of Malherbe, is still considered the best bucolic writer of France. Jean Ogier de Gombauld distinguished himself by his witty epigrams; and Pierre de Gadolin of Toulouse (1579—1649) made a successful attempt to imitate the antient poets of Provence in their own language.

The predilections of Francis the First brought the romance of chivalry again into fashion; but it could not long maintain its ground against the fast-spreading taste for classical literature and its imitations. The romance of chivalry however did not disappear altogether, but it lost its primitive character and degenerated into politico-historical romances and tales of love intrigues. The two French queens Catherine and Maria de' Medici introduced into France a taste for Italian literature, which created the sonnet and the novel; but except the Heptameron, or novels of the queen of Navarre, few compositions of that kind appeared in France. Under queen Anne of Austria the knowledge of the language and literature of Spain was spread in France. The Diana of Montemayor became the general favourite, and it was imitated by d'Urfé in his 'Astrea,' 5 vols., Paris, 1610. But the most important of these productions is the satirical romance of 'Rabelais. We may refer to this epoch, Balsac and Voiture, who formed the epistolary style, which the French have brought to perfection.

Among the historical writers of this period, Thuanus, although he wrote in Latin, occupies the first place, and still maintains his reputation. Theodore Agrippa D'Aubigné wrote a history of his own times. The 'Histoire du Chevalier Bayard, et des plusieurs Choses qui sont advenues sous les Règnes de Charles VIII., Louis XII., et François Premier,' is written with the simplicity and candour of the Memoirs of Joinville. Blaise de Monluc, Marshal of France, wrote memoirs of his military career, which attracted general notice not only in France, but in other countries, and were translated into English by Charles Cotton (of angling memory), and published in 1674, London. The memoirs of Michel de Castelnau are distinguished by their manly style. The first queen of Henry IV., Marguerite of Valois, described in a very attractive manner the French court. Brantome's Memoirs are the most remarkable of this period. La Popelinière wrote a history of France, and Theodore Beza a history of the reformed churches. Perefixe wrote the life of Henry IV., and Sully left his interesting memoirs of the events of his time, and the part which he had taken in them. Henry duke of Rohan (died 1638) has described in a masterly manner the civil wars in which he was the principal leader.

Jean Serran, or Serranus, wrote several historical works, chiefly relating to the affairs of the French protestants, to which body he himself belonged. Bodin (Jean) may be considered the first French political writer: his work, 'De la République,' had great celebrity, and was translated into many languages. It was for some time very popular in this country, and was translated into English: John Bodin's 'Six Bookes of a Commonweale, out of the French and Latine copies, done into English by Richard Knolles,' London, 1606. Gifford says that it was once read in our universities.

In concluding our rapid sketch of this period we must not omit mentioning the moral writers who have added lustre to French literature, and whose works still enjoy a high and well-deserved reputation. Montaigne was one of the shrewdest observers of human character. His friend

Etienne de la Boetie expressed in energetic language the principles of antient freedom, and his little work, 'Discours de la Servitude Volontaire,' written, as Montaigne says, 'in honour of liberty against tyrants,' is perhaps the first vindication of political liberty in a modern language. Pierre Charron, also a friend of Montaigne, became celebrated by his 'Livre de la Sagesse,' which was much attacked on account of some sceptical passages, although the writer showed by his other works that he was an orthodox Roman Catholic clergyman.

Ramus (died in 1572) promoted the study of geometry. Vieta introduced algebra into France: he published his Canon Mathématique' at Paris, 1579. Albert Givard published in 1629 'Invention Nouvelle en Algèbre.' Belon, who travelled in Egypt, Greece, and many parts of Asia, published, in 1555, a description of birds, and introduced a classification of them, which is still esteemed. Rondelet wrote a description of fishes. Tagant, Ambroise Paré, Jaques Guillemeau, distinguished themselves a ssurgical writers; Olivier de Serres, Seigneur de Pradel, published numerous works on various branches of rural economy.

This period produced also many eminent scholars whose labours contributed to elucidate the works of the Greek and Latin authors, and to advance the knowledge of antiquity. Amongst these scholars the first place belongs to Guillaume Budé, better known by his Latinized name of Budæus (died in 1540), who is justly considered as the founder of the study of Greek in his country. Robert and his son Henry Etienne, or Stephens, greatly promoted the knowledge of the Greek and Latin by their lexicographical and other labours. The knowledge of antiquity in general was greatly furthered by the learned researches of Scaliger, Casaubon, Salmasius, &c. The rules of literary composition were laid down about 1500 by Jean Jourdain in his 'Jardin de Plaisance et Fleurs de Rhetorique.' Libilet published in 1548 his 'Art Poetique;' but the best work on that subject during this period is 'De l'Eloquence Française,' by bishop Duvair, published in the sixteenth century. We may add to the above-mentioned works R. Etienne's 'Grammatica Gallica,' 1582, and J. Garnier's 'Institutio Gallicæ Linguæ.'

3. We now come to the age of Louis XIV., which the French call the golden age of their literature, and compare with that of Pericles, Augustus, and the Medici. No doubt much was done during this reign to promote science and literature in France. The language became a universal idiom among the higher ranks of society all over Europe, and the French prose acquired that degree of ease, clearness, and precision which justly entitle it to be considered in those respects as the first language in Europe. The French Academy greatly contributed to purify and refine the language, but at the same time put upon it heavy trammels by injudiciously proscribing every innovation, as if a language ever could remain stationary while a nation is progressive. It severely condemned all expressions and turns which were not tolerated at court, and the precept established by an eminent writer of that period, 'Etudiez la cour et connaissez la ville,' became the general rule of the French writers. This circumstance has certainly given to the French language that refinement and elegance which have rendered it the medium of conversation and epistolary intercourse in the courts and in the diplomacy of Europe; but it had also the effect of emasculating its vigour, and of introducing a glitter and a mannerism into the style of many French writers who have sacrificed the matter to the form.

The French drama rose to a high degree of eminence during this period, but we refer to another article on that subject. [ENGLISH DRAMA.] Among the other poets we may reckon as the most eminent the fabulist Lafontaine, and the satirist and didactic poet Boileau: the works of the latter are certainly the best specimen of the literary taste of that epoch. The epic poem, which had been unsuccessfully attempted by Ronsard, did not succeed better now. Chapelain's 'Pucelle d'Orleans, was well defined by a contemporary epigram, to be born an old woman. De la Motte Houdard's translation of the 'Iliad' is an exceedingly poor production: 'Alaric, ou Rome vaincue,' by George Scudéri, is now entirely forgotten; and 'Clovis' by St. Sorlin, and 'St. Louis' by Lemoine, are hardly remembered.

Such poetry as requires genuine feeling and a truly poetical imagination could not succeed in this artificial age, and not only all attempts at heroic poetry proved a complete failure, but the essays of the lyrical and pastoral kind were not very successful. Madame Deshoulières and Fontenelle wrote eclogues which were once admired, but their shepherds and shepherdesses are nothing more than courtiers in disguise. Segrais is somewhat better, although he does not merit the eulogy of Boileau, who says:—*Segrais dans l'eclogue enchante les forêts.*

The only lyric poet of this period worth mentioning is J. B. Rousseau. The writers of this age endeavoured to make amends for deficiency of genius by a refined art and an elaborate versification, which gave rise to the light poetry, *poesie folâtre, legère badine*, a kind of composition which rapidly developed itself with the fast-growing corruption of manners among the higher classes in France. The most celebrated writers of this libertine school are Chapelle, Chaulieu, &c.

Novels form an important part of the literature of every nation, and they may be considered as a fair criterion of the civilization and taste of the majority of readers. Productions of this kind were very numerous during the age of Louis XIV., and give us a pretty good insight into the intellectual state of the French public at that time. The mythological inspirations, and the inanimate correctness of the poets, who, strictly adhering to the rules laid down by Boileau, seemed to write only for the court, the nobles, and certain fashionable critics, were not shared by the novelists who wrote for the public at large. We must except from the number of novels Fenelon's 'Telemachus,' as it is rather a poem in prose than a novel. The most remarkable of the novel-writers of this period is Calpunede (died in 1663), a man endowed with a bold poetical imagination, though without taste: he took his subjects from Greek and Roman history, but he worked his classical elements into the form of a romance of chivalry, so that there was nothing either Greek or Roman except the names of the heroes; the characters, situations, and adventures, belonged entirely to knight errantry. Calpunede found an imitator in Mademoiselle de Scudéri, whose novels equalled those of Calpunede only in length. The romance of chivalry changed entirely into the historical novel, if this term be applicable to tales which contained scarcely anything historical except the names of the principal heroes.

Many ladies wrote works of this description, of which those of the Countess Lafayette are still read; those of Mesdames Caumont de la Force, Villedieu, &c., are known only to the learned. The scandalous work of Bussy de Rabutin, 'L'Histoire Amoureuse de Gaule,' obtained great notoriety. Fairy tales also became very fashionable, of which the first impulse seems to have been given by Charles Perrault (died in 1713), in his 'Contes de ma mère l'Oye.' Fenelon wrote some for the use of his pupil, the duke of Burgundy. Antoine Galland (1646—1715) translated from the Arabic the 'Thousand and One Nights,' and Petit de la Croix from the Persian the 'Thousand and One Days.' The fairy tales of Count Hamilton had great vogue. To the literature of this description we must add the novel, the most distinguished writers of which are Scarron and Lesage.

The art of elegant letter-writing, which was introduced by Balsac and Voiture, became in France an almost indispensable accomplishment of well educated persons; and many authors, as well as other eminent persons of this period, have left admirable specimens of the epistolary style. Mme. de Maintenon wrote with remarkable talent, and the letters of the Marquise de Sevigné are numbered among the French classics. The letters of the Countess de Staal (1693—1750) derive their charm from their great ease and complete absence of all pretension. It is very doubtful if the letters published under the name of Ninon de l'Enclos are really written by her. The *lettres galantes* of Fontenelle are, like his eclogues, full of mannerism.

Among the philosophic writers of this period are La Bruyère and the physician Cureau de la Chambre, who wrote two excellent works; 1. 'Caractère des Passions,' and 2. 'L'Art de Connoître les Hommes.' We may add to them the witty and biting observations on human life, 'Maximes et Reflexions' of the Duke de Rochefoucauld.

The eloquence of the pulpit reached its acmé in France during this period, and the sermons of Bossuet, Bourdaloue, Fléchier, and Massillon, among the Roman Catholics, and of Saurin among the Protestants, are still regarded as

models of sacred eloquence. Controversy, or polemical divinity, also employed some able writers, there being, in addition to the subject matter of dispute between the Protestants and Roman Catholics, disputes also among the parties of Jansenists and Molinists, which divided the Catholics themselves. The most distinguished writers on that subject were Arnauld, Nicolle, and Pascal.

The historical writers are generally more distinguished by the perfection of their style than by critical skill. The works of Mezeray, though savouring more of a chronicle than of a history, are characterised by a love of truth and candour. The Jesuit Daniel wrote a history of France. Vertot, St. Real, Rollin, Bossuet, Basnage, Fleury belong to this period. Bougeant's 'Histoire de Négotiations qui ont précédé le Traité de Westphalie,' as well as his 'Histoire du traité de Westphalie,' are important for the diplomatical student. Amongst the numerous memoirs, the most remarkable are those of Cardinal de Retz and of the Duke de St. Simon. Charles du Fresne, Sieur du Cange, greatly contributed, by his learned researches, to the knowledge of the Byzantine writers and of the middle ages. Jean Foy Vaillant's numismatical researches are also much esteemed.

The age of Louis XIV. produced many good metaphysicians, as Descartes, Malebranche, and Gassendi, but the most acute critic on all subjects was Bayle.

The art of literary composition and criticism occupied many distinguished authors. The chief works are, 'L'Art Poétique,' by Boileau; 'Dialogues sur l'Eloquence,' by Fenelon; 'Traité sur la manière d'enseigner et d'étudier les Belles Lettres,' by Rollin; and 'Sur le Choix d'Etudes,' by Fleury.

The Academy of Sciences, founded by Colbert in 1666, greatly contributed to the progress of mathematics and natural philosophy in France. The labours of Pascal and Fermat did something, and Descartes still more to the progress of mathematical science. Fr. A. de l'Hôpital published many valuable works on different branches of mathematics. Ozanam wrote several elementary mathematical works, and his treatise on algebra was much valued. Carré published, in 1700, his 'Theorie de Mesurer les Surfaces.' Vauban justly acquired a high reputation by his improvements in the art of fortification, and by his numerous works on military subjects. The Chevalier Folard is well known by his works on Tactics. Tournefort, who made a scientific voyage in the East, added considerably to botanical knowledge and to our general acquaintance with the countries which he visited.

The corruption of manners which infected France in the latter part of the reign of Louis XIV. was increased under the regency of the unprincipled Duc d'Orléans, and pervaded all ranks during the wretched reign of the profligate Louis XV. The eighteenth century in France, which the writers of that period chose to call the age of philosophy, is characterised by hostility to religion in the philosophic writers, intolerance and superstition in the clergy and people, weakness of the government and oppression of the people, and a general absence of the higher considerations of morality and virtue. There were honourable exceptions, but this description is on the whole, applicable, particularly to the higher ranks. The literature of that period is a faithful mirror of the prevalent tendency of the age.

The principal writer of the eighteenth century, who may be considered as the representative and the personification of the age, on which he exercised a most extraordinary influence, is undoubtedly Voltaire. He was the leader of the so-called philosophers of France, and was regarded as an infallible oracle in literature. His character was wavering and full of contradictions: he alternately displayed great virtues and vices, but the leading and unalterable feature of his mind was an excessive vanity, which was fostered by the flattery of kings and princes, his companions or correspondents. His hatred of Christianity became fanaticism. Ridicule was the formidable weapon which he employed with wonderful effect in demolishing absurd prejudices, and sometimes sound principles. Voltaire's ridicule varied according to the occasion, from the light *badinage* of a refined courtier to the bitter derision of contempt, which at times degenerated into low buffoonery. If Voltaire may be justly termed the Democritus of his age, the appellation of Heraclitus may be no less justly applied to his rival in celebrity, J. J. Rousseau, whose influence was scarcely inferior to that of Voltaire. Though Rousseau diffused much error and maintained the most paradoxical opinions, he felt warmly for the happiness of mankind, whose rights he advocated in the most glowing language, which bears the stamp of deep conviction. Voltaire too had a noble and generous feeling for the happiness of mankind, and was the determined enemy of oppression and injustice, as his efforts in the case of Calas and others sufficiently attest; yet carried away by the impetuosity of his temper and his uncompromising hostility to what he considered existing abuses and follies, he seems to have had no other object than to destroy the social edifice, without constructing any thing better in its place. Rousseau, on the contrary, sought to establish a new political and social order, which should ensure the happiness of the human race, and hence his works are still read by philosophic inquirers; while the witty sayings of Voltaire, directed against an order of things which no longer exists, but to the destruction of which, whether it be a praise or a censure, no one man more largely contributed, are either forgotten or known only to those who make literature a pursuit. Next to Voltaire and Rousseau, the most distinguished writer of that time is Montesquieu, the author of the 'Esprit de Loix,' whose works have at least the merit of having rendered political science the favourite study of the French.

Among the metaphysical writers we may name, in the first place, Condillac. The chief propagators of the philosophy of the eighteenth century were the encyclopedists or editors of the French Encyclopædia, of whom the leaders were Diderot and d'Alembert. Next to them in celebrity is Helvetius. The name of Holbach has become notorious by his 'Système de la Nature;' and that of Lametterie by his works, 'L'Homme machine,' and 'La Vie heureuse de Seneque.' The atheistic principles advocated by the two last-mentioned writers were not to the taste of Voltaire, who strenuously maintained pure deism, and received from the atheistic party in return a share of that ridicule which he dispensed so freely to others.

Among the few defenders of revealed religion during this period we may enumerate the accomplished J. Vernet.

Charles Bonnet, of Geneva, occupies a conspicuous place among the metaphysicians of his age. His 'Essai sur la Psychologie, ou Considerations sur les Operations de l'Ame,' and his 'Essai analytique sur les Facultés de l'Ame,' are considered by some as having a tendency towards materialism; but the religious opinions which he constantly expressed at a time when irreligion was the fashion, as well as his work, 'Idées sur l'Etat futur des Etres vivans, ou Palingenesie philosophique,' in which he defended the immortality of the soul and the truth of Christian revelation, must be considered as decisive of his real sentiments.

The historical works of Voltaire, who, though careless in the verification of facts, displayed an unusual degree of critical acuteness, and the productions of Montesquieu, had a marked influence on the study of history. The philosophy of history is indeed a creation of the eighteenth century; but although the writers of that period did much for its advancement, their indiscriminate hostility towards every thing which had for ages been considered as true or sacred, frequently operated most prejudicially to historic truth. One of the most learned historians of that period is Mably. Charles de Brosses, president of the parliament of Dijon, acquired a well-merited reputation by his various historical works, which display deep research and a most diversified erudition. Goguet, in his work 'Recherches sur l'Origine des Loix, &c.,' investigated with great learning and acuteness the history of laws, arts, sciences, and customs. The reputation of Barthélemy, who was really a learned man, must not be measured by his 'Voyage d'Anacharsis:' this work, which long enjoyed and still has some celebrity, may serve as a measure of the spirit in which antiquity was studied and understood at that time. Raynal's 'Philosophical History of the Discoveries and Settlements of the Europeans in India and America,' also a work of considerable reputation, does not maintain the same rank at the present day. De Mehegan published a work entitled 'Tableau de l'Histoire moderne depuis la Chute de l'Empire d'Occident jusqu'à la Paix de Westphalie.' Velly is the author of a voluminous history of France, continued by Villaret, and afterwards by Garnier, a work by no means devoid of merit. Frederic II., the king of Prussia, wrote the history of his own times in French. The works of Rulhières on the troubles of Poland and the intrigues of the northern courts have all the interest of a

romance. Crevier continued Rollin's Roman history. The historical memoirs of this period are very abundant, but they serve rather as a picture of the state of manners than as historical materials. D'Anville advanced our knowledge of antient geography; and Montfaucon and Caylus did the same for the arts of the antients. Pellerin made valuable researches in numismatics.

The eighteenth century was still less poetical than the age of Louis XIV. The model was Voltaire, and particularly his poetical, or rather versified tales. The most successful of these imitators was Parny, who laboured to surpass his master in licentiousness. Gresset is a writer full of wit and grace. Moncrief introduced the ballad into France; and Gilbert, who distinguished himself by his satires and some lyrical pieces, would perhaps have become one of the best poets of France, if he had not been cut off in the prime of life. Madame Du Boccage attempted the heroic: her subject was the discovery of America. The Chevalier Boufflers acquired celebrity for his light and witty poems. Bernard, surnamed Le Gentil, on account of his graceful poetry, imitated Ovid in his 'Art d'Aimer.' Leonard and Berquin successfully imitated Gesner's pastoral poetry. Le Franc de Pompignan acquired deserved celebrity for some beautiful lyric poems; and Louis Racine, son of the tragedian, wrote some beautiful poems on religious subjects. Among the other poets of this period we may mention Dorat, Aubert, Colardeau, and Piron.

The novels of the eighteenth century are stamped with the characteristics of the age. Besides those of Voltaire, Rousseau, and Diderot, there is Marmontel, whose 'Contes Moraux' have nothing moral about them but the name, yet are written in an elegant and correct style. The tales of Florian have really a moral tendency, and some of them are very beautiful. The tales of Bernardin de St. Pierre, and among them his 'Paul et Virginie,' have been translated into most modern languages, and are still read with pleasure. Prevost d'Exilles translated many English novels and wrote some imitations of them himself. The age was also fertile in licentious novels, the most notorious of which are those of J. de Crebillon. The art of literary composition was treated by Dubois in his 'Reflexions Critiques sur la Poésie et la Peinture:' the Jesuit André published a treatise 'Du Beau;' Diderot also wrote on the same subject, and under the same title. Batteux is considered one of the first critics of his time, and his works, 'Les Beaux Arts reduits au même Principe,' and 'Cours de Belles Lettres, ou Principes de la Littérature,' are highly appreciated both in France and abroad. Marmontel wrote 'Poétique Française,' and 'Elémens de la Littérature.' The most celebrated work of that kind in the eighteenth century is Laharpe's 'Lycée, ou Cours de la Littérature Ancienne et Moderne.'

The mathematical and physical sciences made great progress in France during the eighteenth century. In this general sketch it is sufficient to mention the names of D'Alembert, Lagrange, Monge, La Lande, and Lacaille. Our knowledge of the figure of the earth was extended by the measurements made in Lapland by Maupertuis, Clairaut, Camus, Lemonnier, and Celsius; and by the similar operations in Peru of Condamine, Godin, and Bouguer.

At the head of the naturalists of France in the eighteenth century are Buffon and Charles Bonnet. The latter, though born at Geneva (1720), where he spent his life, belongs to France, as having written in the language of that country. He distinguished himself by his researches on the use of leaves in the vegetable economy, 'Recherches sur l'Usage des Feuilles dans les Plantes.' But the work which established Bonnet's reputation is his 'Contemplation de la Nature;' he published also 'Consideration sur les Corps Organisés.' Réaumur wrote a valuable work on insects, 'Mémoires pour servir à l'Histoire Naturelle des Insectes.' Brisson wrote a systematical work on zoology, 'Le Règne Animal,' and a great work on birds, 'Ornithologie, ou Méthode contenant la Division des Oiseaux en Ordres, Sections, Genres, Espèces, et leur variétés,' containing figures of 500 birds, of which 320 had never before been described. Vicq d'Azyr described the mammalia, &c. In botany, Jussieu immortalised himself by establishing a new system of classification of plants. The names of Deluc and Saussure are connected with the history and progress of geology.

Fifth period: from the beginning of the French Revolution to the present time.—The violent changes which the Revolution produced in the social state of France had a corresponding effect on the national character and literature, which, in France, more than in any other country, may be regarded as the true picture of the public mind. The period of the Revolution was not favourable to literature, for at such a time nothing but journals and pamphlets could succeed; but it produced a rapid development of eloquence. The Revolution also broke the trammels imposed by the French Academy on the language, which became enriched by a great quantity of new words generally formed from Greek and Latin elements. From the establishment of the Directory (1795) the Revolution changed its character; its wild movement was stopped, and a wish for repose was generally felt. As soon as the country began to enjoy internal quiet, the intellectual activity of the nation burst forth with a fresh impulse. The Polytechnic School was established in 1796, and the Institut de France was founded the same year by the reunion of the antient Academies of Sciences and of 'Inscriptions et Belles Lettres.' The consular and imperial reign did much for science, but it was not favourable to literature. Practical knowledge and the application of scientific principles were alone in demand. Every man who possessed superior talents had a splendid career opened to his ambition, either by entering the armies of the conqueror, or by devoting himself to mathematical and physical sciences, or the arts; and success ensured him imperial patronage and substantial rewards. But a severe censorship weighed heavily on letters, and suppressed all works which contained opinions contrary to the established order of things; and among the rest the licentious and anti-religious works which had been so abundant in the eighteenth century. The first years of the Restoration were almost entirely absorbed by political pamphlets. Literature however soon began to revive, and France may boast of a great number of excellent works in all branches of human knowledge, which have appeared since the Restoration.

The establishment of a constitution in France, although far from completely insuring the liberty of the nation, has still had a favourable influence on letters. It is true that a check was given to the growth of a sound literature, as well as to the progress of national education, by the unfortunate tendency of the government of the Restoration, which was constantly attempting, under the pretext of restoring Christianity, to which a large part of the nation was decidedly inclined, to undermine constitutional order, and to re-establish by jesuitical machinations the abuses which had disgraced France before the Revolution. This retrograde system produced results quite contrary to what it was intended to effect. It led to the overthrow of the elder branch of the Bourbons, and destroyed all hopes of re-establishing the monarchical and aristocratic institutions of old France; and it also threw back to the philosophy of the eighteenth century many who were gradually returning to religious opinions. The agitated state of France since the revolution of July, 1830, has not been favourable to literature. There is no lack of talent, but it seems that men who tread this volcanic ground have no other object in view than to minister to the ephemeral tastes, or rather caprice of an excited public; a circumstance far from being advantageous to the production of works of a sterling and permanent character. There are however exceptions, and we may hope that France will yet proceed with renewed vigour in its literary career.

Among the poets of this period the first place belongs to Lebrun; though the appellation of Lebrun Pindar, which his countrymen bestowed on him in his lifetime, is rather extravagant. Alphonse de La Martine (born 1790) is not only the first poet of France, but one of the first of his age. His productions, filled with poetical beauties of the highest order, breathe a spirit of religion and pure morality. He has in fact established a new school of poetry in France; and we may safely assert that the magic of his verse has done more towards restoring religious feelings in France than all the efforts of the Roman Catholic clergy, assisted by the government of the Bourbons.

The first poems of La Martine were his 'Meditations Poétiques' (1820), by which he established his reputation; the 'Nouvelles Meditations Poétiques,' 1823, met with equal success. La Martine, who is a great admirer of Byron, published in 1825, 'Le Dernier Chant de Childe Harold,' which however cannot bear any comparison with the poem of which it is a professed continuation.

Not inferior to La Martine is Victor Hugo, the leader of the romantic school. Hugo (born in 1802) is the son of a general in the imperial army, and of the daughter of a Vendean chief. His boyish years were spent in Spain and Calabria, where his father was engaged in active service; and the scenes of an exterminating warfare in which his childhood was passed may account for his early tendency to delineate the horrible. The romantic impressions of his boyhood were increased by the traditions of the Vendean war related by his mother, a woman of a superior character, who devoted herself entirely to the education of her children. These circumstances powerfully contributed to develop the natural talents of Hugo, and to give a bent to his poetical genius. In 1817 he obtained two premiums from the Académie des Jeux Floraux of Toulouse, which conferred on him in the following year the degree of a maître des jeux floraux. The first volume of his 'Lyrical Poems' appeared in 1821, but attracted little attention, although he had already published two novels and two collections of poems. He came into notice in 1827, by his 'Ode to the Column of the Place Vendôme,' which excited a general admiration. Since that time his reputation has been constantly growing. Hugo's principal poems are published under the following titles:—'Odes;' 'Odes et Ballades;' 'Les Orientales;' 'Les Feuilles d'Automne.' His works which have produced the strongest impression on the French public contain great beauties; they display an extraordinary imagination, a deep and glowing feeling, and a profound knowledge of the human heart; but they are frequently disfigured by great extravagancies. His dramatic productions have attained the same popularity, and contain the same beauties and defects as his poems. They are—'Hernani;' 'Marion Delorme;' 'Triroulet, ou le Roi s'amuse;' 'Lucrece Borgia;' and 'Marie Tudor.' His novels are—'Han d'Islande,' a wild production, which, among scenes of raving madness, contains some scattered beauties; 'Bug Jargal' is an episode on the Negro revolt of St. Domingo; 'Le Dernier Jour d'un Condamné' describes with heart-rending vividness the feelings of a man on the point of undergoing capital punishment; 'Nôtre Dame de Paris,' which is the most popular of his novels, although perhaps too much tinged with the horrible, contains an admirable picture of Paris in the 15th century.

The most popular poet of France is undoubtedly Béranger. His witty and truly national songs are in the mouth of every Frenchman, from the highest to the lowest. He was born in 1780, of poor parents, and is entirely self-educated. He is equally distinguished for his rare independence of character, and his poetical talent. He never flattered Napoleon during his reign, neither did he abuse him on his fall. Béranger's songs have attained an historical importance, having been one of the most powerful means of counteracting the retrograde policy of the Bourbons, whose government constantly prosecuted him for ridiculing, in a manner which they could never forgive, their anti-national measures. Songs have long been used in France as a means of directing public opinion: they have compensated in some degree for the want of the liberty of the press, and such has been their influence, that a witty Frenchman defined the government of France before the Revolution, as an absolute monarchy tempered by songs. And indeed Béranger's songs did more harm to Charles X. than all the arguments of the press, or the declamations of the liberal deputies. When government deprived him of a small situation which he held, he said to the minister, 'Monseigneur, je vis maintenant pour faire des chansons, si V. m'otez ma place j'en ferai pour vivre.' Béranger took an active part in the revolution of July, but declined to accept any place under the new government. Since that time he has written little; his occupation, he says, ended with the expulsion of Charles X. Béranger's poems have been often published under the simple title of 'Chansons de Béranger.'

Casimir Delavigne has acquired his reputation chiefly by his dramatic productions: 'Paria;' 'Les Vêpres Siciliennes;' 'Marino Faliero;' 'Louis XI.;' 'Les Fils d'Edouard;' and his comedy, 'l'Ecole des Vieillards.' He excels however particularly in elegies, of which he published in 1817, 'Les Messeniennes,' which express a patriot's sorrow at the humiliation of his country. The subject of his 'Nouvelles Messeniennes,' 1822, is the struggle of the Greeks for their liberty. He has written also a beautiful elegy on Byron's death. His poems are characterised by exact versification, beautiful imagery, and noble thoughts; but in true poetic inspiration he is inferior to La Martine and Victor Hugo. Delavigne belongs to the classical school as well as Viennet, who has acquired considerable celebrity by his poetical epistles and some dramatic productions. Among the other French poets of the period, Millevoye was particularly successful in elegies, of which 'La Chute des Feuilles' is one of the finest productions of the kind in the French language. Legouvée is the author of 'Le Merite des Femmes.' Barthelemy and Mery established a kind of poetical partnership, and published in conjunction poetical satires: 'La Villeliade,' 'Rome à Paris,' 'La Peyroneyde,' 'La Corbiereyde,' which are clever, but being on subjects of only temporary interest, could only have temporary success. Their epic poem, 'Napoleon en Egypte,' contains many beautiful lines; but the success which it obtained in France, like that of 'Le Fils de l'Homme,' written on the young son of Napoleon, was chiefly owing to the popularity of the subject.

Didactic and descriptive poetry has been much cultivated in France during this period. Foremost among these poets stands Delille. The other distinguished writers of this class are—Esmenard, who wrote 'La Navigation;' Chenedollé, 'Le Génie de l'Homme;' the historian Daru, 'L'Astronomie;' Leroux, 'Les Trois Ages;' and Berihoux, the author of 'La Gastronomie,' a production full of sparkling wit and humour.

The epic has been attempted by many recent French poets, but without success. Musson described in his 'Helvétiens' the war of the Swiss against Charles the Bold; Baour Lormian, the translator of Tasso, attempted to imitate Ossian in his 'Poëmes Galliques.' Perceval de Grande Maison wrote 'Philippe Auguste,' which some critics consider the best of the epic poems of this period. Creuze de Lessert attempted a series of epic poems, founded on the romances of the middle ages: 'Les Chevaliers de la Table Ronde;' 'Amadis de Gaule;' and 'Les Pairs de Charlemagne.' Lucien Bonaparte has added to the list by his 'La Cirneide, ou Corse Delivrée;' and 'Charlemagne, ou Rome Delivrée.' Millevoye is the author of 'Charlemagne' and 'Alfred,' both which poems, although far from attaining the elevation of the epic, are not devoid of beauty.

Among the prose writers Chateaubriand is one of the most popular, both in France and abroad. In 1790, when a very young man, he visited America, a circumstance which gave birth to his work, 'Les Natchez, ou Tableau de la vie des Tribus Indiennes,' which is a poem, though not in verse. On his return to Europe he published in England his 'Essai, historique, politique et moral, sur les Revolutions anciennes et modernes.' This work contains liberal opinions, and had great success, but Chateaubriand afterwards retracted those opinions which he styled his errors, and wrote, according to his own expression, a new work with an old faith: *un ouvrage nouveau avec une foi antique.* This work, which appeared under the title of 'Génie du Christianisme,' is doubtless a brilliant production; but its popularity may be partly ascribed to its having appeared at a time when France, wearied and exhausted by the excesses of the Revolution, sought for tranquillity and repose. The chief object of his 'Martyrs,' a poem in prose, is to prove, by placing in juxtaposition the fictions of the Greek mythology and the tenets and traditions of the Christian religion, that the latter supply materials for poetry as good as, and even better than, the former. His 'Itinéraire de Paris à Jerusalem' owes its reputation more to the vividness than the correctness of his descriptions. Chateaubriand's works contain great beauties; his style is glowing, and full of brilliant imagery, and his descriptions are admirable; but his thoughts are not always profound or correct, and frequently want connexion. His language also sometimes degenerates into bombast; and there is truth in the remark, that his words are often greater than his ideas. Among his other works the most remarkable are 'Etudes ou Discours Historiques sur la Chute de l'Empire Romain, la Naissance et le Progrès du Christianisme, et l'Invasion des Barbares;' and his essay on English literature.

Next to Chateaubriand, Mme. de Stael has perhaps had the greatest influence on the literature of France.

Among the remaining French prose writers we shall mention, first, those who have treated metaphysical subjects.

The French metaphysicians are divided into three principal schools. 1. The sensual, which, being the offspring of the eighteenth century, appeared the first, and under the name of the ideological, was long the dominant school in

France. Its chief representatives are Cabanis, Destutt de Tracy, and Garat. The 2nd is the school of the philosophy of Catholicism and Absolutism, founded and supported chiefly by the Comte de Maistre, Lamennais, and Bonald. The 3rd is that of an eclectic philosophy, or of a rational spiritualism; it comprehends many eminent writers, who are not however united among themselves by any positive tenet, but only by the rejection of the materialism of the first, and of the spiritualism of the second school. The characteristics of these philosophical schools may be summed up in a few words. The first, or the ideological school, establishes the faculty of feeling (*la faculté de sentir*) as the sole principle of all the operations of the human mind, and founds its system entirely on perception (*contemplation, sensation*). According to this system, there is only a sensual faculty of perception, and our thoughts are nothing but modified sensations. This philosophy limits its knowledge to the world of sense, for it does not admit the existence of any other. It has been applied with success to the mathematical and physical sciences; but its application to religion, ethics, politics, and literature, has not been accompanied with equally favourable results. A consistent philosopher of this school either does not admit the existence of a Deity, or considers that the universe is the Deity, or that every atom is Deity; and as the soul is by the same theory only a result of the activity of our organization, the belief in its immortality becomes an inconsistency, and the practical philosophy of the school is the art of rendering life agreeable. Cabanis, one of the most illustrious of this school, seems to have been terrified by his own conclusion, *Les nerfs, voilà tout l'homme;* and emphatically declares that the moral faculties are something quite different from those which result from our physical organization, and that they belong to another order of things than the physical world. (*Rapports du Physique et du Moral de l'Homme.*) This declaration was not a subterfuge in order to avoid the accusation of undisguised materialism, but a real conviction. Cabanis developed this idea in his posthumous work, 'Sur les Causes Premieres,' where he states that the soul ought not to be regarded as a part of the animal organization, but as a separate substance and a real being, which, by its presence, gives the corporeal organs the motion which constitutes their functions.

Besides Cabanis, the most eminent writers of this school are Garat, Condorcet, Destutt de Tracy, and Volney. Among the recent works of this same school, the most remarkable is Dr. Broussai's 'De l'Irritation et de la Folie, ouvrage, dans lequel les Rapports du Physique et du Moral sont établis sur la base de la Médecine Physiologique,' Paris, 1828.

The second philosophical school of France, the religious or theological, is founded on the Scriptural doctrine of original sin, and the consequent corruption of mankind. According to this system, men exist in this world merely for the purpose of expiating the original sin, and consequently they ought not to enjoy liberty, which would prevent them from doing penance. All governments must therefore be severe and absolute, and everything should be done according to the will of God, whose representative, the pope, has the supremacy over all the governments of the world. The founder of this system, the Comte de Maistre, employed the great powers of his mind and his extensive erudition in maintaining this theory, the consequence of which is unconditional submission to existing authority, however tyrannical it may be. He advocated his doctrine chiefly in his 'Soirées de St. Petersburg, ou Entretiens sur le Gouvernement Temporel de la Providence,' and in his work on the Pope. It is rather extraordinary that in this century, when the principles of political liberty have made such progress, a doctrine which preaches nothing less than the most abject slavery, should find numerous partisans. Such however is the case, and several French writers of great talent have undertaken the defence of these doctrines. Among them we may mention the Vicomte de Bonald, a man of great ability, but full of sophistry, and who frequently loses himself in his metaphysical abstractions: his work is entitled 'Théorie du Pouvoir Politique et Religieux et Législation Primitive.' L'Abbé Lamennais, who is perhaps the first prose writer in France, has advocated the same system as the Comte de Maistre, but from a more philosophical point of view, and with more ability, elegance, and success. De Maistre seeks to impose on the human mind the dogma of authority. Lamennais endeavours to persuade the adoption of the same dogma by the motives of despair. He shows that everything is a matter of doubt and uncertainty, and that men have no other guide than the authority of a universally admitted opinion (*assentiment universel*). Having laid down this proposition, he deduces with great ingenuity, by arguments from history and tradition, the consequence that the doctrines of the Roman Catholic church must be considered as the *assentiment universel*, beyond which there is no truth to be found. He maintains that whoever abandons the authority of Rome must necessarily err, not only in matters of religion, but in every other respect. Every deviation from the doctrines of the church is a punishable dissent; every resistance to the infallible decision of the pope is an impious rebellion; even the Gallican church, which claims some liberties, is a heresy. There is only one church and one doctrine, and every state which does not support that doctrine by all the means in its power, and tolerates different religions, commits a crime; and because states now tolerate several kinds of worship, human society is sinking into an abyss, and is becoming atheistical. In order to cure the evils which infect society, it is necessary to bring it back to the sole religious doctrine from which it has strayed, and the pope must become the absolute ruler of human reason.

These doctrines, which would scarcely have been taught even two centuries ago in Roman Catholic countries, were proclaimed by Lamennais in 1817 in his 'Essai sur l'Indifférence en Matière de Religion;' and owing to the magic of the style in which he clothed his opinions, he produced a powerful sensation, and gained many partizans, chiefly among young men. He continued to maintain the same opinions in some periodicals, and in his work, 'De la Religion considérée dans ses Rapports Civils et Religieux.' When the revolution of July gave another form to civil and ecclesiastical affairs in France, he appeared again before the public, and began to edit, in conjunction with l'Abbé Lacordaire and the count Montalembert, a periodical called 'l'Avenir,' in which, following up the principle of the new constitution, which acknowledges no dominant religion, he maintained with the greatest eloquence that the Roman Catholic clergy of France should now become entirely independent of the state, and neither receive any support from it nor suffer any interference of the government in their affairs. This doctrine however was not approved by the French clergy, and the pope manifested his dissent from it. In 1834 appeared the 'Paroles d'un Croyant:' this little production, which was written in the most beautiful language, and labours to establish on the basis of the gospel pure democratical principles, produced an extraordinary sensation. Such doctrines were however too much opposed to the principles of the Roman Catholic church, and the pope formally condemned them. Since that time the abbé has declared against Rome.

Among the writers of the eclectic school is De Gerando, who began his career with the ideological philosophy, and his first work, 'Des Signes et de l'Art de Penser, considérés dans leur Rapports Mutuels,' is based on that system. He gradually abandoned the ideological school, and his 'Histoire comparée des Systèmes de Philosophie relativement aux Principes des Connoissances Humaines,' has contributed to diffuse a knowledge of the German philosophy in France, and is considered the best work in French on the history of philosophy. His leading idea is that all the course of man's life should be a continued self-education, embracing all his faculties, and directing all his actions; and he has developed these principles in his work, 'Du Perfectionnement Moral, ou de l'Education de soi-même.' His work, entitled 'Visiteur du Pauvre,' was crowned by the Academy, and obtained the prix Monthyon of 10,000 francs. Laromiguière, author of the 'Analyse des Sensations,' and of the 'Leçons de Philosophie, ou Essai sur les Facultés de l'Ame,' has established a system of philosophy peculiar to himself. Maine de Biran, who began by being an ideologist, and became afterwards a spiritualist, made himself known by his works, 'Sur l'Influence de l'*Habitude*:' 'Sur la Décomposition de la Pensée;' and 'Examen des Leçons de M. Laromiguière.' Keratry has attacked the materialist opinions in his 'Inductions Morales et Physiologiques,' and in his 'De l'Existence de Dieu et de l'Immortalité de l'Ame.' Among the best writers of the anti-materialist school is the baron Massias, 'Rapports de la Nature à

l'Homme, et de l'Homme à la Nature; ou, Essai sur l'Instinct, l'Intelligence, et la Vie,' 5 vols.; and 'Théorie du Beau et du Sublime Principes de la Littérature, de Philosophie, de la Politique, et de la Morale.' Bonstetten, of Geneva, is the author of 'Etudes sur l'Homme; ou, Recherches sur les Facultés de Sentir et de Penser;' and Droz has written 'De la Philosophie Morale; ou, des Différens Systèmes sur la Science de la Vie.' Royer Collard and Joufroy introduced the Scotch philosophy into France, and translated the works of Dugald Stewart and Reid. The most popular metaphysical writer of France is Victor Cousin, the translator of Plato. His system, which he calls 'Eclectisme Impartial appliqué aux Faits de Conscience,' is chiefly based on the German philosophy, though the Germans think that he has conceived their ideas very superficially. His contributions to the 'Journal des Savans,' and to the 'Archives Philosophiques' appeared under the title of 'Fragmens Philosophiques;' and a continuation of them under the name of 'Nouveaux Fragmens.' His lectures on philosophy have also been published, 'Cours de l'Histoire de Philosophie.' Among the important works which have recently appeared in France on metaphysical subjects, we must mention Benjamin Constant's 'De la Religion considérée dans sa Source, ses Formes, et ses Dévelopemens,' as well as his 'Principes de la Politique applicable à tous les Gouvernements Représentatifs, &c.,' and Lerminier's 'Philosophie du Droit,' and 'De l'Influence de la Philosophie du Dix-huitième Siècle sur la Legislation et la Sociabilité du Dix-neuvième,' by the same author. We recommend to those who wish to make a particular study of the French modern metaphysics, Damiron's 'Essai sur l'Histoire de la Philosophie en France pendant le Dix-neuvième Siècle.'

The French historians of this period may also be divided into three schools—1, The systematical, or national school, the present head of which is Guizot; and which seeks from a given mass to deduce certain consequences and principles; 2, the descriptive, or narrative, to which belong Barante, the two Thierrys, and Capefigue: the object of this school is to describe events, and delineate characters and manners with all possible fidelity without indulging in any reflections; 3, the fatalistic school, the chief writers of which are Mignet and Thiers. This school occupies itself only with political history: it narrates the principal events, and represents the good or evil actions of individuals as necessary consequences of them.

Guizot was born at Nîmes in 1787, of a protestant family, and studied at Geneva, where he became thoroughly acquainted with the German philosophy and literature. Guizot's political life is foreign to our subject, and we shall limit ourselves to his literary labours. He commenced as an author very early in life, having published in 1809 his 'Nouveau Dictionnaire des Synonymes de la Langue Française,' which was followed by the 'Vies des Poëtes Français du Siècle de Louis XIV.,' published 1813, and 'Annales de l'Education,' 6 vols., 1811-15. He began his historical career by publishing the lectures which he had delivered on history. Those of 1821-22 were published under the title of 'Histoire du Gouvernement Représentatif.' The 'Cours d'Histoire Moderne,' delivered 1828-30, contains the 'Histoire de la Civilization en France depuis la Chute de l'Empire Romain, jusqu'en 1789,' 5 vols.; and the 'Histoire Générale de la Civilization en Europe depuis la Chute de l'Empire Romain,' &c., which is an introduction to the preceding work, and one that well deserves an attentive study; 'Histoire de la Révolution d'Angleterre depuis l'Avénement de Charles I. jusqu'à la Restauration de Charles II.' Besides his historical works Guizot is the author of several valuable essays on political subjects: 'Quelques Idées sur la Liberté de la Presse,' 1814; 'Sur le Projet de Loi relatif à la Liberté de la Presse,' 1814; 'Du Gouvernement Représentatif, et de l'Etat Actuel de la France,' 1816; 'Essai sur l'Histoire et l'Etat Actuel de l'Instruction Publique en France,' 1816; 'Des Moyens de Gouvernement et d'Opposition dans l'Etat Actuel de la France,' 1821; 'De la Peine de Mort en Matière Politique,' 1822; 'Des Conspirations et de la Justice Politique,' 1821. Guizot has also published, in conjunction with others, a 'Collection des Mémoires relatifs à l'Histoire de France depuis la Fondation de la Monarchie jusqu'à Louis XIII.,' 31 vols., and 'Collections des Mémoires relatifs à l'Histoire de la Révolution d'Angleterre.' Sismondi of Geneva has treated of an amazing variety of subjects in his numerous historical works, which enjoy a great popularity all over Europe. His 'Histoire des Républiques Italiennes du Moyen Age,' 16 vols., he has condensed for Dr. Lardner's 'Cyclopædia' into one little volume. He has also written 'Histoire de la Renaissance de la Liberté en Italie,' 2 vols.; 'Histoire de la Chute de l'Empire Romain, et du Déclin de la Civilization de 250 à 1000.' But his chief work is 'L'Histoire des Français,' of which, though unfinished, more than twenty volumes have appeared. Sismondi has displayed a deep knowledge of philosophy in his 'Histoire de la Littérature du Midi de l'Europe,' and a thorough acquaintance with political science in his work, 'De la Richesse Commerciale; ou, Principes d'Economie Politique, appliqués à la Legislation du Commerce;' and in his 'Nouveaux Principes d'Economie Politique.'

Augustin Thierry has thrown considerable light on the history of France during the middle ages in his 'Lettres sur l'Histoire de France,' and his 'Dix Ans d'Etudes Historiques.' At the same time he has pointed out with great sagacity the defects of the existing French histories. But the work which has established his reputation is 'Histoire de la Conquête de l'Angleterre par les Normands, de ses Causes et de ses Suites jusqu'à nos Jours.' His brother Amedée Thierry evinced considerable talent in his 'Histoire des Gaulois depuis les temps les plus reculés jusqu'à l'entière soumission de la Gaule à la domination Romaine;' and in the 'Resumé de l'Histoire de Guyenné.' Thiers' 'History of the French Revolution,' in 10 vols., has obtained universal popularity; and Mignet's on the same subject, which is much more condensed, is also deservedly esteemed.

The work of the Abbé Montgaillard, entitled 'L'Histoire de France depuis le Règne de Louis XVI. jusqu'à l'An 1825,' has the merit of brilliant narration, and the introduction contains much valuable information. Depping has written 'Histoire des Expéditions Maritimes des Normands et de leur Etablissement en France au Dixième Siècle.' Barante, the author 'De la Littérature Française pendant le Dix-huitième Siècle,' has also published a voluminous but very entertaining work, which contains a faithful picture of the times in his 'Histoire des Ducs de Bourgogne,' 13 vols., with an atlas, portraits, maps, &c. Audin is the author of 'Histoire de la St Barthelemy,' 1826; and the Comte de St. Aulaire of 'l'Histoire de la Fronde,' 3 vols., 1827.

The 'l'Histoire de la Restauration et des Causes qui ont amené la Chute de la Branche ainée des Bourbons,' 6 vols., 1832, an anonymous work, was for some time ascribed to the ex-minister Duc Decazes, but it is the production of Capefigue, one of the most learned writers of France, and also the author of the following works: 'Histoire de Philippe Auguste;' 'Histoire Constitutionelle et Administrative de la France depuis Philippe Auguste;' 'Essai sur les Invasions des Normands.' Daru's 'Histoire de la Brétagne,' and particularly his 'Histoire de la République de Venise,' are generally admitted to be masterpieces. Roujoulx's 'Histoire des Rois et des Ducs de la Brétagne,' is not devoid of merit. Dulaure has given a rather dark picture of past ages in his 'Histoire Physique, Morale, et Civile de Paris,' 10 vols. He has also published 'Histoire des Environs de Paris,' and 'Esquisses Historiques sur la Révolution Française,' 8 vols. Lacretelle obtained considerable popularity by his 'Histoire de France pendant le Dix-huitième Siècle,' and 'Histoire de la France pendant les Guerres de Religion;' but the same success has not attended his 'Histoire de la Révolution Française,' partly on account of its ultra-royalist tendency. Ferrand's 'L'Esprit de l'Histoire,' has attracted much notice, although written in favour of absolute governments. He is also the author of a valuable work, particularly viewed with reference to the excellent materials which it contains for the history of the eighteenth century, 'Histoire de Trois Démembremens de la Pologne.' Michaud's 'Histoire des Croisades' has considerable reputation, as well as his 'Histoire du Progrès et de la Chute de l'Empire de Mysore sous les Règnes de Hyder Aly et de Tippo Saib.' The work entitled 'Les Juifs d'Occident, ou Recherches sur l'Etat Civil, le Commerce, la Littérature des Juifs en France, en Italie, et en Espagne, pendant le Moyen Age,' treats a subject that has seldom and only imperfectly been touched by the historian. Buignot threw considerable light on the

middle ages by his 'Histoire du Gouvernement Féodal.' We may consider as belonging to French literature the works of the late Prussian minister for foreign affairs, Ancillon, 'Considérations générales sur l'Histoire,' and his 'Tableau des Révolutions du Système politique de l'Europe.'

Military history has been treated by Dumas, in his 'Précis des Evénemens Militaires, ou Essai Historique sur les Campagnes de 1799 à 1814,' 26 vols.; and by Jomini, 'Traité des grandes Opérations Militaires,' 18 vols. Chambray and Labaume have written the history of the campaign of Russia in 1812. Segur's work on the same subject, which has merit as a literary composition, contains little military information, and belongs to the class of poems in prose. Marshal Gouvion St. Cyr is the author of 'Mémoires sur les Campagnes depuis 1792 jusqu'à la Paix de Campo Formio,' 4 vols.; of which his 'Mémoires sur les Campagnes sous le Directoire, le Consulat, et l'Empire,' form a continuation. General Foy's 'History of the Peninsular War' is a work of merit; but the most remarkable work on the subject is undoubtedly that which Napoleon dictated at St. Helena: 'Mémoires pour servir à l'Histoire de France sous Napoléon, écrites à St. Helène, sous la dictée de l'Empereur, par les Généraux qui ont partagé sa Captivité, et publiés sur les Manuscrits entièrement corrigés de sa main;' 8 vols. The work of the same great man on the wars of Cæsar, which has been recently published, is not less valuable and interesting.

There is an extraordinary abundance of historical memoirs relating to this period. J. F. Banière and St. Albin Berville have published, 'Collection des Mémoires relatifs à l'Histoire de la Révolution Françoise;' 'Mémoires particuliers pour servir à l'Histoire de la Révolution;' and 'Collection des Mémoires Historiques des Dames Françaises.' Of the Mémoires relating to Napoleon, the most important are those of Lascazas, who accompanied Napoleon to St. Helena, Bourienne, B. Fain, Constant, &c. Those of Madame Campan (femme de chambre of the unfortunate Marie Antoinette), Carnot, Fouché, Louis XVIII., Mirabeau, M. de Roland, &c., are all works of great interest, inasmuch as they relate to the most eventful period in the history of the world. The most entertaining of this class of productions are the 'Mémoires de Madame de la Roche Jaquelain,' who describes in an admirable manner the scenes of the Vendean war, of which she was an eye-witness herself. The French have done much for biography during this period; and the 'Biographie Universelle, Ancienne et Moderne,' 60 vols., although very unequal in point of merit, is still the best work of the kind in the compass of European literature. The 'Biographie des Hommes Vivans,' 5 vols., 1814-16, and the 'Biographie Nouvelle des Contemporains,' 25 vols., 1820, are written rather in a party spirit, and not entitled to any great praise. The 'Biographie Universelle et Portative des Contemporains,' 1826, is considered to be more impartial than the two works just mentioned. The 'Dictionnaire Historique par Bauvais, révu par Barbier,' 1826, and the 'Biographie Médicale,' also deserve notice. Villemain has written a 'Life of Cromwell.' An important service has been rendered to chronology by St. Allais in the 'Art de vérifier les Dates;' and by Courcelles' 'L'Art de vérifier les Dates depuis 1770 jusqu'à nos Jours.' The 'Tableaux de la Littérature au Seizième Siècle,' by St. Marc Girardin; Villemain's 'Cours de la Littérature,' and his 'Mélanges Historiques et Littéraires;' and Ginguené's 'History of the Literature of Italy,' are valuable additions to literature.

Parliamentary eloquence sprung up in France during this period. The best speeches of the public men are collected in the 'Choix de Rapports, Opinions, et Discours prononcés à la Tribune Nationale depuis 1789 jusqu'à ce jour,' 20 vols., 1818-22; and 'Collection des principaux Discours et Choix des Rapports et Opinions prononcés à la Chambre des Pairs et à la Chambre des Déptutes depuis la Session de 1815,' &c. Those who wish to become acquainted with the eloquence of the French bar may consult *Le Barreau Français, Collection des Chefs d'Œuvres de l'Eloquence judiciaire en France*, 16 vols., Paris, 1823, by Clair and Clopier; and the *Annales du Barreau Français;* also Dupin's *Choix de Plaidoyers et de Mémoires;* and Bonnet's *Discours et Plaidoyers.*

Amongst the other writers of this period we may mention Madame de Genlis; Jouy, who is a masterly painter of contemporary manners; Nodier, author of many novels and works on literary criticism, &c. Novels are exceedingly abundant, but most of them seem to delight in scenes of horror and profligacy. We must except from this censure 'Cinqmars,' by Alfred de Vigny, which is perhaps the most successful imitation of the kind of novel created by Scott, and 'Tristan le Voyageur,' by Marchangy, which exhibits a most interesting picture of France during the fourteenth century.

The mathematical and physical sciences have been cultivated in France during this period with great success; and a mere catalogue of the works would not only carry us far beyond our limits, but would be foreign to the purpose of this sketch, which is to exhibit the literary character of the age.

Those who wish to make a particular study of the history of the French language and literature may find ample materials in the following works:—*Histoire de la Langue Française*, par Henry, 2 vols., Paris, 1812; *Nouvelles Recherches sur les Patois*, par Champollion Figeac, Paris, 1809; *Examen critique des Dictionnaires de la Langue Française*, par Nodier, Paris, 1828; *Essai d'un Glossaire Occetanien*, par Rochegude, Toulouse, 1819; Raynouard's *Grammaire comparée des Langues de l'Europe Latine, dans leurs Rapports avec la Langue des Troubadours, Recherches sur l'Ancienneté de la Langue Romane; Elémens de la Grammaire de la Langue Romane avant l'année* 1000, and his *Grammaire Romane*, are exceedingly valuable for the study of the *Langue d'Oc*, or the southern French. Not less important for the history of the *Langue d'Oil*, or northern French, is the work of the last-named author, entitled *Observations Philologiques et Grammaticales sur le Roman de Rou;* and Roquefort's *Glossaire de la Langue Romane*. A great deal of curious research on the history of the French language is contained in the *Archéologie Française, ou Vocabulaire des Mots anciens tombés en désuétude et propres à être restitués au Langage moderne*, by Pougens, 2 vols., Paris, 1825; *Trésor des Recherches et Antiquités Gauloise et Françoise*, by Borel, 1665; and Lacombe's *Dictionnaire du vieux Langage François*, Paris, 1767. Mercier has published a *Dictionnaire du bas Langage*, 2 vols., Paris, 1808. For the study of the modern French, the Dictionary of the French Academy may be consulted, which has gone through many editions, and *Supplement au Dictionnaire de l'Académie, contenant les Termes appropriés aux Arts et aux Sciences, et les Mots nouveaux consacrés par l'usage*, Paris, 1825; *Dictionnaire de l'Académie Franç., Supl., contenant environs* 11,000 *Mots nouveaux, rédigé par une Société de Grammairiens*, Paris, 1831; *Dictionnaire Raisonné de Difficultés de la Langue Française*, Paris, 1822; *Dictionnaire Etymologique de la Langue Franç.*, par Roquefort, Paris, 1829; *Philologie Française*, par Noel Carpentras, Paris, 1831; *Nouveau Dict. Universelle des Synonymes Françaises*, par Girard, Bauzée, Roubaud, and Guizot; *Dictionnaire des Proverbes Franç.*, par De la Mesanges, Paris, 1821. For the study of the French literature, the works of Laharpe, Barante, Guizot, and others which have been already mentioned, as well as the articles relating to French writers in the *Biographie Universelle* and the *Biogr. Univ. Portative des Cotemporaines* may be consulted.

FRANCE, ISLE OF. [MAURITIUS.]

FRANCHE COMTE', a province of France, and one of the thirty-two military governments into which, under the old regime, that kingdom was divided. It is of an irregular oblong form, having its greatest length from north-north-east, near the head of the river Saône, to south-south-west, near the town of St. Julien, on the Sarrand, a feeder of the Ain, above 130 miles, and its greatest breadth at right angles to the above, from near the river Vingeane, to the banks of the Doubs, more than 90 miles. It was bounded on the north by Lorraine, on the north-east by the principality of Montbéliard (which has, since the French Revolution, been incorporated with France), on the east by Switzerland, from which it was separated by the Jura, on the south by Bresse, and on the west by the province of Bourgogne, and on the north-west by Champagne. Its principal subdivisions and towns were as follow. The population of the towns is from the census of 1836.

Bailliage d'Amont—Vesoul (capital of the bailliage), 5887; Faucogney; Luxueil; Jussey; Gray, 6535; Lure, 2950; Baume les Dames, 2519.—Bailliage du Milieu—Besançon, capital of the bailliage and of the whole province 29,718; Ornans; Quingey; Dôle, 10,137.—Bailliage

d'Aval — Lons-le-Saulnier, capital of the bailliage, 7684; Salins; Arbois; Poligny, 6492; Orgelet; Sainte Claude, 5238; Pontarlier, 4890.

The province is wholly in the basin of the Rhône: it is watered by the Saône and the Ain, feeders of the Rhône, the Doubs, and Oignon, feeders of the Saône, and several other streams belonging to the same system. The lower and more level parts of the province are fruitful in grain; the upper parts produce pasturage for a vast number of cattle. The province is now divided into the departments of DOUBS, JURA, and SAÔNE HAUTE.

La Franche Comté was, in the time of Cæsar, inhabited by the Sequani, a Celtic people, one of the most powerful in Gaul. Their contentions with the Ædui led them to call in the Germans, under their king Ariovistus, by whose aid they effectually humbled their opponents; but the warlike strangers whom they had introduced became the tyrants of that part of Gaul, and especially of the unhappy Sequani. Cæsar drove out the Germans (45 B.C.); but it was for the natives only a change of masters, and the Sequani, with the rest of Gaul, passed under the yoke of Rome. [BOURGOGNE.] Under the Roman dominion Franche Comté, with Switzerland and part of Bourgogne, constituted the province of Maxima Sequanorum.

Upon the downfal of the Roman empire Franche Comté was comprehended in the kingdom of the Burgundians, upon the overthrow of which it became subject to the Franks. In the division of the territories of Clovis among his sons and descendants, it formed part of the kingdom of Austrasia, and afterwards of Lotharingia, or Lorraine. In the reign of Charles le Simple, king of France, to whom, after several changes, this district, then called Haute Bourgogne (Upper Burgundy), or the principality Outre Saône (beyond the Saône) had fallen, Besançon, with the surrounding districts, was formed into a county, called the county of Bourgogne, in favour of Hugues, the first count (A.D. 915). Some writers however represent Franche Comté to have been part of the kingdom of Bourgogne Transjurane, and postpone the erection of the county of Bourgogne till A.D. 995. (See *L'Art de vérifier les Dates*.)

Renaud III. (A.D. 1127-1148), count of Bourgogne, whose dominions had acquired great extent, reaching from Bâle to the Isère, refused homage on various pleas to Lothaire, emperor of Germany, to whose predecessors the counts of Bourgogne had paid homage, and maintained his refusal during his life. It is supposed that the county derived from this circumstance its designation of La Franche Comté. The marriage of his daughter to the emperor Frederick Barbarossa brought the county into the hands of that prince, who made Besançon a free imperial city. He resigned the county to his son Otton, by the marriage of whose descendants the county passed into various hands, as of the kings of France and the dukes of Bourgogne of the first and second race of the blood royal of France. On the death of Charles le Hardi, last duke of Bourgogne of the second race [BOURGOGNE], the county passed, with a considerable portion of his inheritance, to the archduke Maximilian, from him to his grandson Charles V., and so to the Spanish branch of the Austrian family. In 1668 Louis XIV. of France conquered Franche Comté from the Spaniards, but restored it by the peace of Aix-la-Chapelle in the same year. He again conquered it in 1674, and it was ceded by Spain to France at the peace of Nimeguen in 1678.

FRANCHISE, a species of incorporeal hereditament. Franchise and liberty are used as synonymous terms, and their definition is a royal privilege, or branch of the king's prerogative, subsisting in the hands of a subject. Being therefore derived from the crown, such privileges must arise from the king's grant, though in some cases they may be held by prescription, which presupposes a grant. [PRESCRIPTION.] The kinds of them are various, and almost infinite, and may subsist in corporations, in one man, or in many, as co-tenants. (2 Bl. *Com.* 37.) A few instances may be mentioned: thus a county palatine is a franchise, and so are privileges given to corporate bodies, forests, chases, the right to wreck [FLOTSAM], deodands, estrays, &c. [DEODAND; ESTRAY.] Franchises may be lost or forfeited by the parties who enjoy them, if they misuse their privilege or neglect to perform the requisite duties in respect of them [FERRY]; and if the owners are disturbed or incommoded in the proper exercise of their franchise, which is an injury known to the law as a disturbance of franchise, they may have remedy in a special action on the case; or where the franchise is to levy a toll, they may distrain for the amount alleged to be due. [DISTRESS.] (3 Bl. *Com.* 236.)

FRANCIS I. of France was, like Louis XII., descended from Charles the Wise through Louis I. duke of Orleans. This unfortunate prince was assassinated by John duke of Burgundy, and his two sons were for a long period prisoners to the English. The younger of the two, John count of Angoulême, was succeeded by his son Charles. During the life of Louis XI. the count of Angoulême had some difficulty in guarding against the jealousy of the king, and by his command married Louisa of Savoy, who, on the 12th of September, 1494, became the mother of Francis I. Louis XII. took charge of the infant heir of Angoulême at the death of his father, and afterwards gave him his daughter Claude in marriage. Francis distinguished himself in the defence of the frontiers on the side of Spain and Flanders, and succeeded to the throne at the age of twenty-one, in January, 1515.

One of his first endeavours was to prosecute the claim on the duchy of Milan, which he derived from his grandmother Valentine. Against this expedition the Swiss had already combined with Pope Leo X. and with the king of Spain; but Francis having passed the Alps unexpectedly, a battle took place at Marignano, in which the Swiss infantry fought with even more than their usual obstinacy and courage. The combat lasted two days, and from 10,000 to 15,000 Swiss are said to have fallen in it. The victorious French entered Milan on the 23rd of October, 1515, and a peace was shortly after concluded with the pope.

In January, 1516, the prince (afterwards Charles V.) who was destined to be the rival of Francis throughout his whole career, succeeded to the kingdom of Castile, notwithstanding his mother Joan was still alive. The frontier states to France on the side of Flanders and of the Pyrenees were thus in the hands of one and the same monarch. The treaty of Noyon (1516) re-established for a short time the peace of Europe; and the king of France endeavoured to prepare himself against future wars by securing the friendship of the Swiss, whom he had learnt to appreciate as enemies. The Venetians and the Pope also became his allies.

On the death of Maximilian, emperor of Germany (1519), Charles and Francis declared themselves candidates for the imperial crown. The former urged his claims as one of the house of Austria and as the only prince in Europe who, by uniting the wealth of the New World and the arms of the Old, could arrest the progress of the Sultan Selim II. The latter put forward his greater experience in war, and dwelt on the impolicy of placing the joint power of Spain, Flanders, Naples, and the empire in the hands of an Austrian prince. Henry of England was inclined to become a competitor himself, while Leo X. would gladly have seen on the German throne some prince of less importance than Charles or Francis, and one who had no power or claim in Italy. It is said that the crown was offered to the elector of Saxony, who declined it and secured the election of Charles. Francis had an interview with the king of England between Guines and Ardres, and Charles landed at Dover on his voyage from Corunna to the Netherlands (1520).

In 1521 Francis made an attempt to recover Navarre for the family of Jean D'Albret; but after the capture of Pampeluna the French were repulsed from before Logroño, and finally lost all they had previously gained. Another cause of quarrel arose from Robert de la Mark, lord of Bouillon, declaring war against the emperor and throwing himself on France. Mézieres was defended by Bayard against the imperial army, and a pretended attempt at mediation having been made by Wolsey, who was intriguing for the papal crown, a league was concluded against Francis by the emperor, the king of England, and the pope. Lautrec, the general of Francis, being deserted by his Swiss auxiliaries, was driven from the Milanese by Prosper Colonna; Parma and Placentia were united to the ecclesiastical states; and the death of Leo X. is said to have been accelerated by joy at the successes of his allies (1521). The French, although reinforced by 10,000 Swiss, were defeated at Bicocca; and while Milan and Genoa were being lost in Italy, Henry of England attacked Picardy and Normandy. In 1523 the Venetians, hitherto friendly to Francis, joined the pope and the emperor against him; and his own subject, the constable of Bourbon, exposed to the

vengeance of slighted love on the part of the king's mother, fled to his enemies. The French under Bonnivet, however, passed the Ticino in spite of the veteran Prosper Colonna; and the failure of three attacks on the side of Gascony, Burgundy, and Picardy left Francis in as good a position as the strength of his adversaries could allow him to hope for. In the spring of 1524 Pescara and Bourbon defeated the French on the Sesia; and in this battle fell Bayard, 'the knight without fear and without reproach.' An attempt on the part of the imperialists to maintain the war in Provence was frustrated by the king, who passed the Cenis and advanced on Milan. Of that city he obtained possession; but by laying siege to Pavia, which was gallantly defended by Antonio de Leyva, he gave time for the imperial generals to reorganise their forces. This they did with such effect, that on the 24th of February, 1525, they utterly defeated the French troops, and Francis himself remained a prisoner in the hands of Lannoy, vice-king of Naples. He announced the result of the battle of Pavia to his mother in the celebrated words, 'Tout est perdu fors l'honneur!' Robertson says, 'On that occasion the great abilities of Louisa the regent saved the kingdom, which the violence of her passions had more than once exposed to the greatest danger.' Henry of England and his minister Wolsey were inclined to listen to her overtures; the former because he was alarmed at the growing power of Charles, the latter because he had been a second time disappointed of the papal crown by the election of Clement VII.

Charles demanded, as the ransom of the French king, Burgundy for himself, Provence and Dauphiny for Bourbon, and the renunciation of all claims on the Italian states. He caused his prisoner to be conveyed by sea from Genoa to Barcelona, and thence to Madrid, where he detained him in rigorous confinement, until the alteration in his health made the emperor fear the loss of all the advantages which he had anticipated. At length the treaty of Madrid was arranged (1526). Francis was to cede Burgundy, to give up all claims on Italy or on the sovereignty of Flanders and Artois, to restore Bourbon to his dignities and estates, to marry Eleanor queen dowager of Portugal, sister to the emperor, and finally to deliver his eldest and second sons as hostages for the fulfilment of these stipulations. While he pledged his oath and honour for the observance of the conditions of the treaty, he caused a secret protest against the validity of his promise to be prepared. He set foot on France a little more than a year after the battle of Pavia, and mounting his horse, put him into a gallop, exclaiming, 'I am yet a king!'

It very soon became obvious that the French king did not intend to adhere to the treaty of Madrid. While Charles in vain demanded the fulfilment of his oath, from which the pope had absolved him, Francis entered into a league with the Venetians, Clement, and Henry of England. The imperial generals, taking advantage of a delay on the part of the French, reduced the castle of Milan, though obstinately defended by Sforza, whom Charles had already declared to have forfeited his duchy. In 1527 Bourbon advanced upon Rome: he himself fell in the assault of that city, which suffered more from the army of a Christian emperor, the especial patron of the Roman see, than it had ever done from the most barbarous of its heathen invaders. Clement himself, shut up in the castle of St. Angelo, was at length obliged to surrender, and was only released for a heavy ransom at the termination of six months.

Notwithstanding some disposition on the part of the emperor to relax the terms of the treaty of Madrid, the negotiations terminated in a declaration of war on the part of France and England. Charles accused his rival of perjury, to which Francis replied by a challenge to single combat.

In February, 1528, the imperial army, wasted by the disease consequent on its excesses, was with difficulty dragged off from the miserable city on which it had preyed for ten months. Lautrec followed them, and sat down before Naples; but the French army were in their turn attacked by disease, and finally reduced to a wretched remnant, which surrendered to the prince of Orange at Aversa. Andrew Doria, disgusted with the conduct of the French, renounced their alliance and liberated Genoa, while Antonio de Leyva ruined the French army in the Milanese as completely as the prince of Orange had ruined that which besieged Naples. The success of the Turk in Hungary, and the progress of the Reformation, inclined the emperor to peace, and the treaty of Cambray was concluded by the negotiations of Margaret of Austria and Louisa of Savoy (August 5, 1529). Charles agreed not to urge his claim on Burgundy, while Francis renounced the sovereignty of Flanders, abandoned Italy, and bound himself to pay 2,000,000 crowns as the ransom of his sons. In consequence of a treaty between the pope and the emperor, Florence was restored to the Medici, and Clement allowed himself to be guided by the wishes of Charles as to the divorce of Catherine of Aragon from Henry VIII. He met however with eagerness a proposal on the part of Francis for the marriage of his niece, Catherine de' Medici, to the duke of Orleans, afterwards Henry II.

The dissensions in the empire manifested by the diet of Augsburg (1530) and the league of Schmalkalden, induced the French king to encourage that religious party in Germany which he persecuted in his own dominions. During the absence of Charles in Africa (1535) he advanced into Italy under pretext of punishing Sforza, now returned to his duchy, for the execution of his ambassador, and seized the territory of Savoy. It was not until the spring of 1536 that the emperor was able to take active measures against him. Sforza died, and the imperial troops drove the French out of Savoy and advanced to the frontiers of Provence. The French had laid waste the whole of Dauphiny; and although Arles and Marseilles were besieged, Montmorency, a second Fabius, kept his troops under the walls of Avignon and refused to risk a battle. This policy succeeded so well, that at the end of two months the imperial army was compelled to retreat in a miserable state. After an attack by the French on the side of Flanders, a cessation of arms was at length agreed on through the mediation of the two sisters, the queens of Hungary and France. The exhausted state of his treasury, and the fear of an alliance between Francis and the Turk, induced Charles to consent to a cessation of arms in Piedmont also, which was followed by a truce for ten years, concluded at Nice.

Charles then embarked for Barcelona, but being detained by contrary winds on the coast of Provence, Francis proposed a personal interview. The French king went on board the emperor's galley, and the latter returned his visit at Aigues Mortes. Thus after years of the bitterest hostility and enmity, after accusations of perjury on the one hand and of murder on the other, and after a challenge to mortal combat, these two princes presented the singular spectacle of apparent reliance on each other's good faith and honour. The marriage of James V. of Scotland with Magdalen of France, and afterwards with Mary of Guise, tended greatly to estrange Henry of England from the French court, while a better understanding seems to have followed the interview of Charles and Francis. A proposal made by the citizens of Ghent to deliver their town into the hands of the latter, was not only rejected, but the designs of the malcontents were betrayed to the emperor (1539). Charles put the sincerity of his new friendship to a more severe test, by asking permission to pass through France on his way from Spain to the Low Countries. Francis met him at Chatellerault and received him as his guest in Paris. A promise was made of investing the duke of Orleans with the duchy of Milan; but all demands for its fulfilment on the part of the ambassadors of Francis were evaded by the emperor.

While the latter was preparing his expedition to Algiers, the king of France sent to demand satisfaction for the murder of his ambassador to the Porte, Rincon, who was assassinated, if not by the orders, at least with the connivance of the Marquis del Vasto, the governor of Milan. On the ground of this outrage war was again declared (1542), but the king of England and the Protestant princes remained firm to the emperor. The subsequent operations in Roussillon, Flanders, and Piedmont, produced no events of importance until the battle of Cerisoles (April 11, 1544), in which the French were completely victorious. On the other hand, Charles advanced into Champagne with a large and well-appointed army, and Henry VIII. besieged Boulogne. On the 11th September, 1544, a peace was concluded at Crespi, which the emperor consented to, principally from fear of the Turk and from the increasing strength of the Protestants. Francis did his utmost to animate these two parties; but in 1547, on the last day of March, the death of the French king relieved his opponent from many of the apprehensions which he had entertained.

In reviewing the position of Francis during his whole struggle with the emperor, we are struck with the enormous

force against which he had to contend. France, in his reign, sustained the same character in which she appeared again in the following century. As in the time of the thirty years' war, she, a Catholic power, aided the Protestant cause; so in the early part of the sixteenth century, when the danger was the more imminent, from the whole strength being concentrated in the hands of Charles V., the French king was the only efficient hindrance to the universal monarchy of the house of Austria. It was Francis I. who favoured the revolt of Geneva from the duke of Savoy, and enabled that city to found an independence which was afterwards to become one of the main props of the reformed faith. While however he fostered religious rebellion in Germany, he proved his orthodoxy in Paris by the utmost cruelty to the heretics. The gallant manner in which he struggled against his formidable rival, and grappled with him again and again after the heaviest blows, excites our sympathy in his favour: his personal courage was undoubted, and his generosity on the two occasions in which Charles put himself in his power, more chivalrous than his conduct with reference to the treaty of Madrid. The author of his life, in the 'Biographie Universelle,' says, 'If it was perjury, every Frenchman was his accomplice.' The hard nature of the conditions however cannot justify an open and deliberate oath, accompanied by a secret protest as its antidote. He is said to have requested knighthood from the sword of Bayard, and his usual mode of affirming what he said was—'Foi de Gentilhomme.' In his family Francis was far from happy: by his first wife Claude of France, daughter of Louis XII., he had three sons and four daughters; his eldest, the Dauphin, was said to have been poisoned by his cup-bearer, Montecuculi: whether such was the fact is very doubtful, and there is certainly no reason to suppose that the crime was instigated by Charles V. The second son succeeded to the throne by the title of Henry II. His second wife, Eleanor of Portugal, bore him no children. His private life is not entitled to much praise. Madame de Chateaubriand, sister of Lautrec, the duchesse d'Etampes, and la belle Féronière, were successively his mistresses: to vengeance on the part of the husband of the last he is said to have owed his death. In his reign ladies for the first time became constant attendants at the French court, and the foundation was laid for those profligate manners so fully developed in the succeeding reigns.

As the patron of art and literature, Francis the First ranks deservedly high. He reigned at the moment when sounder learning and higher principles of art were spreading from Italy to the rest of Europe. Budé, Lascaris, Erasmus, the Stephens, and Marot, were enabled to boast of his countenance to letters: he is well known as the patron of Primaticcio and Cellini; while a greater than either, Leonardo da Vinci, is said to have died in his arms. (Robertson's *Charles V.*; Père Daniel, *Histoire de France*; *Dictionnaire de Bayle*; *Biographie Universelle*; Leopold Ranke, *Geschichte der Päpste*.)

FRANCIS II. of France, born in 1543, was the eldest son of Henri II. and of Catherine de' Medici. He married, in 1558, Mary Stuart, only daughter of James V. of Scotland. On the death of his father, 10th July, 1559, Francis became king, being then sixteen years of age. He entrusted the government to Francis duke of Guise and his brother the cardinal of Lorraine, uncles of Mary Stuart. This was the beginning of the civil and religious wars which desolated France for half a century. Anthony of Bourbon, king of Navarre, and Louis his brother, prince of Condé, with the other princes of the blood, and the great officers of the state, being indignant at seeing all the power of the state in the hands of two strangers, conspired against the Guises, and joined the Protestants for that purpose, as the Guises were the zealous supporters of Catholicism. In March, 1560, the Guises having been informed of a conspiracy against them, removed the king and court to the castle of Amboise: the king named the duke of Guise lieutenant-general of the kingdom, and a number of persons were arrested and executed. Soon after the edict of Romorantin was issued, which constituted the bishops judges of heresy, and took the cognizance of this offence from the parliaments. It was said that the chancellor De l'Hôpital consented to this edict in order to avoid a greater evil, namely, the establishment of the Inquisition in France, which was proposed by the cardinal de Lorraine, and in hopes that the bishops would prove more humane than the parliaments, who had put a great number of Protestants to death.

By a former edict, issued at Escouen by Henri II. in June, 1559, all the Lutherans were declared punishable by death. The name of Huguenots, to denote the Calvinists as a distinct sect, was introduced soon after. The admiral de Coligni having presented to the king a memorial in their favour, it was resolved, at the suggestion of the chancellor De l'Hôpital, to leave them in peace, until the general council should decide, and that if the pope did not assemble a general council, a national council should be convoked in France. The king assembled the states-general at Orleans, when the prince of Condé, on his arrival, was arrested on the charge of a conspiracy, and condemned to lose his head; but he was saved by the death of the king, 5th December, 1560, after a reign of only seventeen months. He was succeeded by his brother Charles IX., then a minor. Francis II. died of an abscess in his ear; and the rumours of poison which were spread at the time seem, according to De Thou and other historians, without foundation.

FRANCIS I., emperor of Germany, born in 1708, was the son of Leopold duke of Lorraine, who was the son of Charles V. of Lorraine, and of Eleonora Maria, daughter of the emperor Ferdinand III. Francis's mother was the princess of Orleans, niece of Louis XIV. On the death of his father in 1729, Francis succeeded him as duke of Lorraine and Bar. In consequence of the war of the Polish succession, Lorraine was ceded to Stanislaus Leczinski, father-in-law of Louis XV., to revert after his death to the crown of France, and Francis received Tuscany in exchange, which duchy became vacant by the extinction of the house of Medici. Francis married in 1736 Maria Theresa of Austria, the only daughter and heiress of the emperor Charles VI. In January, 1739, he went to reside at Florence with his consort. In 1740 Charles VI. died, and Maria Theresa succeeding him in the hereditary dominions of the house of Austria, she made her husband coregent with herself, but gave him little share in the administration. He however commanded her armies in the war which she had to sustain in order to secure her inheritance. [MARIA THERESA.] After the death of the emperor Charles VII. in 1745, Francis was elected his successor on the imperial throne. In 1748 the peace of Aix-la-Chapelle restored peace to Germany and to Europe; but in 1756 a new war broke out between Prussia and Austria, known by the name of the Seven Years' War, which was terminated by the peace of Hubertsburg, in February, 1763. The following year Joseph, the eldest son of Francis, was elected king of the Romans, and in 1765 Francis died at Innsbruck, and Joseph succeeded him as emperor of Germany; his mother however retaining in her hands the sovereignty of the Austrian dominions till her death. As emperor of Germany and grand-duke of Tuscany, Francis left behind him the reputation of a good prince, though he was involved in long wars against his inclination.

FRANCIS II., emperor of Germany, and I. of Austria, the eldest son of Leopold II. and of Maria Louisa of Spain, was born at Florence in February, 1768. At an early age he was sent to Vienna to be brought up under the eyes of his uncle, Joseph II., who gave him the best preceptors in that capital. He was particularly well instructed in the science of administration, and he made himself master of all its details. He was also engaged in several campaigns against the Turks, and was present at the taking of Belgrade, by General Laudon, in 1789. When Joseph II. died, in 1790, Francis took the direction of the government till the arrival of his father from Florence. Two years afterwards Leopold himself died, in 1792, and Francis, who succeeded to his vast dominions, was likewise elected his successor to the imperial crown. He came to the throne at a very anxious moment. The rash or premature, though well-meant reforms of Joseph II., had sown deep discontent in several parts of the hereditary states of Austria, which the conciliatory measures of Leopold had not had time to allay: the Belgians were in open revolt, and Francis himself was on the eve of a war with France. In April, 1792, Louis XVI. was obliged, by the legislative assembly, to declare war against him. The Austrian armies on the Rhine carried on the war for some years with varied success, and without any definite result; but the successes of Bonaparte in Italy, in 1796-7, decided the fate of the war. [BONAPARTE.] By the treaty of Campoformio, Francis gave up Belgium and the duchy of Milan, receiving in exchange Venice and

Dalmatia. In 1799 a new coalition took place between Austria, Russia, and England, and the allied armies were eminently successful, both in Italy and Germany; but a misunderstanding between the Austrian and Russian commanders led to the defeat of the Russians in Switzerland. In 1800, Bonaparte having won the battle of Marengo and re-conquered Lombardy, negotiations of peace followed; but Francis refused to treat separately from his ally, England, and hostilities began afresh. The French under Moreau having gained the battle of Hohenlinden, advanced towards Vienna, when Francis proposed peace, and the treaty of Luneville followed in 1801, by which Ferdinand, the emperor's brother, was obliged to give up Tuscany, and his uncle to renounce Modena. In December, 1804, while Napoleon crowned himself emperor of France at Paris, Francis foreseeing the approaching dissolution of the German empire, declared himself hereditary emperor of Austria. In 1805, feeling jealous of the new encroachments of Napoleon in Italy and Holland, the Austrian cabinet formed a new coalition with Russia and England. The campaign was unfavourable to Austria, the French entered Vienna, and the battle of Austerlitz finished the war. By the following peace of Presburg, December, 1805, Austria gave up the Venetian states and the Tyrol. The old German empire was now dissolved after a thousand years' duration; and in August, 1806, Francis renounced the title of emperor of Germany, and assumed that of Francis I., emperor of Austria, king of Bohemia and Hungary, &c. He now availed himself of some years of peace to repair the calamities of the former wars, to make reductions, enforce a strict economy, and support the credit of the state. In the war of Napoleon against Prussia, 1806-7, Austria maintained a strict neutrality. After the peace of Tilsit and the conferences of Erfurt between Napoleon and Alexander, the occupation of North Germany by the French, and the invasion of Spain, the emperor Francis felt alarmed, and prepared for a fresh struggle, which he saw must take place sooner or later for the independence of his crown. Availing himself of Napoleon's embarrassments in Spain, at the beginning of 1809, he began alone a fourth war against France, with a force of 400,000 men. The archduke Charles commanded the army of Germany, and the archduke John that of Italy, whilst a force under General Chasteler entered the Tyrol, where the people rose to a man for their former sovereign. This war had a different character from the preceding, inasmuch as the people of Germany began now to take part against the French; corps of partisans were formed under Schill, the duke of Brunswick Oels, and others who annoyed the French, and a general spirit of insurrection manifested itself against the foreign yoke. The operations of the war were also conducted on a different plan from the former wars of Marengo, Austerlitz, and Jena, when a single battle had decided the fate of the war. The Austrians now fought detached engagements with various success, and although obliged to retire, and even to abandon Vienna, the archduke Charles kept his army together in good order. The battle of Aspern was fought with a tremendous loss on both sides, and Napoleon was obliged to retire across the Danube. After some time the battle of Wagram took place, and although lost by the Austrians, yet the archduke retired in good order towards Bohemia. He proposed an armistice, which Napoleon accepted, and after long negotiations the peace of Schönbrunn took place in October, 1809. Austria gave up Trieste, Fiume and Croatia, Salzburg, and part of Gallicia.

In 1810 Napoleon married a daughter of the emperor Francis. In 1812, during the Russian campaign, an auxiliary Austrian corps, under Schwartzenberg, acted in Poland against Russia, but it effected little. In 1813 Austria resumed its neutrality, and offered its mediation between Russia and France on condition that both powers should evacuate Germany. On Napoleon's refusal, Austria joined the allies, and its army contributed mainly to the great battle of Leipzig, which decided that campaign. In the following year the Austrian armies entered France by the way of Switzerland, and occupied Burgundy and Lyon. The emperor Francis followed the movements of his troops, and after the Russians and Prussians had entered Paris, in April, 1814, he proceeded to that capital, where he remained two months. In June, 1814, he returned to Vienna, where the congress of the European powers opened its sittings. In 1815, after Bonaparte's return from Elba, the Austrian troops advanced again by the Simplon road and occupied Lyon. Meantime another Austrian army had driven Murat from Naples and re-established the old King Ferdinand. From that epoch till his death the emperor Francis remained at peace, with the exception of a short campaign against the constitutional party at Naples in 1821, when his troops appeared as auxiliaries to King Ferdinand. When the events of July, 1830, were known at Vienna, Francis and his minister, Prince Metternich, withstood the suggestions of the more violent legitimists, and determined not to interfere in the internal affairs of France provided that power respected the existing treaties with regard to its foreign policy. Prussia and England followed the same course, and thus Europe was saved from another general war. Francis died at Vienna on the 2nd of March, 1835, in his sixty-seventh year, and was succeeded by his eldest son Ferdinand.

The personal character of the emperor Francis has been spoken of favourably even by his enemies. In Austria and his other German states he was decidedly popular, and personally loved, especially by the middling and lower classes. He was accessible to all; kind and plain spoken, simple and regular in his habits, assiduous to business, and his moral conduct was unexceptionable. His policy and administration have been differently judged by writers, according to their respective opinions. He was decidedly and openly averse to political innovation; having suffered much from the French revolution and its consequences, he had conceived a horror of revolutions, and of every movement that partook of a democratic spirit. The ruling principles of his administration were love of order, minuteness of detail, economy, and strict subordination. These principles, which agreed pretty well with the character of his German subjects, clashed with the temper of the people of Italy, whose activity, love of pleasure, military ambition, and national spirit, had been stimulated during twenty years of French dominion. The people of Lombardy, especially the educated classes, felt dissatisfied at being reduced to the condition of an Austrian dependency. Conspiracies were hatched, which all failed, and only served to render the Austrian government suspicious and severe. Of the persons implicated some escaped, others were tried and condemned to death, which sentence the emperor commuted to imprisonment for various periods in several fortresses, but mostly in the castle of Spielberg, in Moravia. In other respects Francis's administration was mild and temperate. He promoted material improvements, roads, canals, and manufactures. His views of commercial policy were of the old or Colbert school. In one particular he deserves unqualified praise, as the promoter of popular education: he established elementary schools throughout all his dominions, and superintended himself all the details and working of the system. An account of the system is given in an article in No. VI. of the 'Quarterly Journal of Education,' entitled 'Italian Education.' With regard to religious tolerance, Francis followed the principles of his predecessors, Joseph and Leopold. He also completed the code of laws begun by them, which is called by his name. Further details concerning the emperor Francis, his court, and cabinet, may be found in the following works among others: Russel's *Tour in Germany; Austria as it is*, London, 1827; Menzel, *Reise-nach Oesterreich*, 1831; and a book published at Paris in Italian, called *Semplice verità opposta alle menzogne di Enrico Mislei*, 1834, in which many exaggerated or unfounded charges against the emperor Francis are refuted by means of authentic facts and figures. Although the policy of Austria has been guided by its ministers, who have generally been very able men, yet there is no doubt that the personal character and principles of the emperor Francis have had very considerable influence.

FRANCIS (SAINT), and FRANCISCANS. St. Francis, the founder of one of the four orders of mendicant friars, called Franciscans, was born at Assisi, in Umbria, in 1182. He was the son of Peter de Bernardino, a wealthy merchant, and his mother's name was Pica. His mother christened him John, but his father, who was absent at the time of his birth, changed his name to Francis. Wadding, in the 'Annales Minorum,' says, because he learned French early, to qualify himself for his father's profession, Jacobus de Voragine turns it into a miracle; 'Primò ratione miraculi connotandi: linguam enim Gallicam miraculosè a Deo recepisse cognoscitur.' (*Acta Sanctor.* Octob., tom. ii.

p. 559.) St. Francis was at first a young man of dissolute manners, but in consequence of a fit of sickness, about the year 1206, he became so strongly affected with religious zeal as to take a resolution to retire from the world. He now devoted himself to solitude, and mortified himself to so great a degree that the inhabitants of Assisi judged him to be distracted. His father, thinking to make him resume the habits of ordinary life, threw him into prison; but finding that this made no impression upon him, he carried him before the bishop of Assisi, in order to make him renounce all title to his father's temporal possessions, which he not only agreed to, but stripped off all his clothes, even to his shirt. He then prevailed with a considerable number of persons to devote themselves, as he had done, to the poverty which he considered as enjoined by the gospel, and drew up an institute, or rule, for their use, which was approved by Pope Innocent III. in 1210, as well as by the Council of Lateran held in 1215. In 1211 he obtained from the Benedictines the church of Portiuncula, near Assisi, and his Order increased so fast that when he held a chapter in 1219, near five thousand friars of it were present. He subsequently obtained a bull in favour of his Order from Pope Honorius III. About this time he went into the Holy Land, and endeavoured in vain to convert the Sultan Meledin. It is said that he offered to throw himself into the flames to prove his faith in what he taught. He returned soon after to his native country, and died at Assisi in 1226. He was canonized by Pope Gregory IX. the 6th of May, 1230, when, October 4th, the day on which his death happened, was appointed as his festival.

The followers of St. Francis were called Franciscans, Grey, or Minor Friars; the first name they had from their founder; the second from their grey clothing; and the third from a pretended humility. Their habit was a loose garment of a grey colour, reaching to their ancles, with a cowl of the same, and a cloak over it when they went abroad. They girded themselves with cords, and went bare-footed.

This order was divided into several bodies, some of which were more rigid than others. The most ample and circumstantial account of it is to be found in *Annales Minorum, seu Trium Ordinum à S. Francisco Institutorum, auctore Luca Waddingo Hiberno;* the second and best edition of which was published at Rome by Jos. Maria Fonseca ab Ebora, in 19 volumes in fol., 1731-1744, with a supplement, *Opus posthumum Fr. Jo. Hyacinthi Sbaraleæ*, fol., Rom., 1806. To Wadding we are indebted for the *Opuscula S. Francisci*, 4to., Antw. 1623; and the *Bibliotheca Ordinis Minorum*, 4to., Rom., 1650. The *Acta Sanctorum* of the Bollandists already quoted (*Octob.* tom. ii. p. 545-1004), contains several lives of St. Francis, including that by St. Bonaventure.

Davenport (*Hist. Fratr. Min.* p. 2) says this order came into England in 1219; but Stow, Dugdale, Leland, and others, say the Franciscans came in 1224, and that they had their first house in Canterbury, and their second at London. Tanner says (*Notit. Monast.* pref. p. 13), that at the dissolution the Conventual Franciscans had about fifty-five houses in England; but from the last edition of Dugdale's 'Monasticon,' it appears they had sixty-six. Their rule, as translated by Stevens, with several charters of Edward III. and one of Richard II. in favour of them, will be found in that work, vol. vi. p. iii., pp. 1504-1508. See also Parkinson's *Collectanea Anglo-Minoritica, or a Collection of the Antiquities of the English Franciscans, or Friars Minors, commonly called Gray Friars*, 4to., Lond. 1726.

The original of the Franciscan rule will be found in Wadding's 'Annales,' vol. i. pp. 66-79.

FRANCIS, REV. DR. PHILIP, was the son of the Rev. John Francis, dean of Lismore, and rector of St. Mary's, Dublin, in which city Philip was born in the early part of the last century. The common biographical dictionaries say that the rector of St. Mary's was expelled from his preferments at the Revolution on account of his Tory principles; but this must be a mistake, if we may rely on the dates given in a detailed memoir of Sir Philip Francis, by a personal friend in the Annual Obituary for 1820, where it is stated that the Rev. John Francis was nominated dean of Lismore in 1722. The story of the ejection, if we may trust to this authority, cannot even be true of the grandfather of the subject of the present article, whose name was also John; for he, it seems, became dean of Leighlin in 1696, and sat in convocation in 1704. Philip was educated at the university of Dublin, and then entered the church, the profession to which his progenitors for several generations had belonged. About the year 1750 he came over to England, and set up an academy at Esher in Surrey, where Gibbon was for a short time one of his pupils; but the historian in his posthumous memoirs gives no favourable account of the improvement he made. Francis, he says, 'preferred the pleasures of London to the instruction of his pupils.' While in this situation he published his poetical translation of Horace, which immediately brought him into notice, and still continues to be reprinted. It has the advantage of being the only complete modern metrical version in English of the works of that poet, but has no pretensions to be considered an adequate representation of the original. He also published in 1757 a translation of the 'Orations of Demosthenes and Æschines,' in 2 vols., 4to. Before this he had published two tragedies, 'Eugenia,' 8vo., 1752, and 'Constantine,' 8vo., 1754. 'Eugenia' was acted at Drury Lane, Garrick sustaining the principal character; but although repeated for nine nights, it was very indifferently received. It is said in the 'Biographia Dramatica' to be little more than a free translation of a French tragedy by Grasigni, called 'Cenie,' of which a literal version was published the same year under the title of 'Cenia; or, the Supposed Daughter.' 'Constantine' was produced at Covent Garden. 'It met with very bad success,' says the Biog. Dram., 'although not by many degrees the worst of the productions of that season.' These literary performances obtained for the author the acquaintance of many of the most distinguished persons of the time; but he secured a connexion more important to his worldly interests by some political pamphlets which he is said to have written, though they seem to have appeared without his name, and their titles are not given in any of the biographical notices of him that we have seen. From a passage in the Preface to his Translation of Demosthenes, it may be inferred that he took the Whig, or what is commonly called the liberal side of politics. The biographer of his son in the Annual Obituary says, that 'he is mentioned in Wilkes's Letters as being engaged in some delicate negotiations on the part of the Right Hon. Henry Fox, afterwards Lord Holland.' He was chaplain, it seems, to Lord Holland, and assisted in the education of his son Charles, afterwards the distinguished orator. Through Lord Holland's influence he was presented to the rectory of Barrow in Suffolk; in 1764 he was also appointed joint-chaplain to Chelsea College. He died in 1773.

FRANCIS, SIR PHILIP, was the son of the Rev. Dr. Philip Francis, and was born in Dublin, 22nd October, 1740. When his father came over to England in 1750, he was placed on the foundation of St. Paul's School, London, where he remained about three years. Here, it is worth observing, one of his school-fellows was Mr. Henry S. Woodfall, afterwards the printer of the 'Public Advertiser,' and the publisher of the 'Letters of Junius.' In 1756 he was appointed to a place in the office of his father's patron, Mr. Fox, then secretary of state; and when Fox was succeeded by Pitt in December of this year, young Francis had the good fortune to be recommended to, and retained by, the new secretary. In 1758, through the patronage of Mr. Pitt, he was appointed private secretary to General Bligh, when that officer was sent in command of an expedition against the French coast; and while serving in this capacity he was present at an action fought between the British and French forces in the neighbourhood of Cherbourg. In 1760, on the same recommendation, the earl of Kinnoul, on being appointed ambassador to Portugal, took Francis with him as his secretary. He returned to England in 1763, when the Right Hon. Wellebore Ellis, afterwards Lord Mendip, gave him an appointment of considerable consequence in the War Office, over which he then presided. He retained this place till March, 1772, when he resigned in consequence of a quarrel with Lord Barrington, who had by that time succeeded Mr. Ellis. The remainder of that year he spent in travelling through Flanders, Germany, Italy, and France. In June, 1773, soon after his return, he was appointed to the distinguished place of one of the civil members in council for the government of Bengal, with a salary of 10,000*l*. He is said to have owed this appointment to the influence of Lord Barrington, whose hostility therefore

would appear to have been now converted into very substantial friendship, or who must be supposed to have had private reasons for such an exercise of his patronage. He set out for India in the summer of 1774, and remained in that country till December, 1780, when he resigned his situation and embarked for England, after having had a quarrel with the governor-general Mr. Hastings, which produced a duel, in which Mr. Francis was shot through the body. He had opposed Hastings, and for some time effectually, from his entrance into the council, but the sudden death of two of his colleagues by whom he had been generally supported, had latterly left him in a helpless minority in his contest against the policy of the governor-general. In 1784 Mr. Francis was returned to parliament for Yarmouth in the Isle of Wight, and soon began to take an active part in the business of the House of Commons, where, although he was not a fluent speaker, the pregnancy of his remarks and the soundness and extent of his information always commanded attention. He took his side from the first with the Whig opposition, and to that party he adhered while he lived. When it was resolved in 1786 to impeach Mr. Hastings, it was proposed that Mr. Francis should be appointed one of the managers of the impeachment; but all the eloquence of Burke, Fox, and Windham, (aided by his own) could not overcome the feeling of the House against placing in this situation a man with whom the accused had had a personal quarrel. The motion was twice negatived by large majorities. Nevertheless there was much force in what was urged in its support, and the casuistry of the question was not a little curious and perplexing. The benefit of the talents and information of Mr. Francis was eventually secured to the prosecution by a letter inviting his assistance, which was addressed to him by the unanimous vote of the committee of managers; and this business occupied his chief attention for many years. When the war with France broke out, Mr. Francis adhered to the party of Fox and Grey, and was one of the first and most active members of the famous association of the Friends of the People. At the new election in 1796 he stood candidate for Tewkesbury, but failed in being returned, and he did not sit in that parliament. In 1802, however, he was returned for Appleby, by Lord Thanet, and he continued to sit for that borough while he remained in parliament. The question of the abolition of the slave trade was that in which he took the keenest and most active part in the latter term of his parliamentary career; and it is said that in advocating the abolition, he took a course as much opposed to his private interests as it was in conformity with his public principles. On the formation of the Grenville administration, Mr. Francis was made a knight of the bath, 29th October, 1806; and it is believed that it was at first intended to send him out to India as governor-general. That appointment however never took place. He retired from parliament in 1807; and after this, the interest which he continued to take in public affairs was chiefly evinced by occasional political pamphlets and contributions to the newspapers. In 1816 great attention was drawn to Sir Philip Francis, by Mr. John Taylor's very ingenious publication, entitled 'Junius identified with a distinguished Living Character,' the object of which was to prove that he was the author of the celebrated 'Letters of Junius.' It may at least be confidently affirmed, that no case half so strong has yet been made out in favour of any one of the many other conjectures that have been started on the subject of this great literary puzzle. Sir P. Francis however, it is said, persisted to the last in rejecting the honour thus attempted to be thrust upon him. His acknowledged publications (all of them pamphlets) amount to twenty-six in number, according to a list appended to the memoir of his life in the 'Annual Obituary.' One of the most curious of them is the last, entitled '' Historical Questions, exhibited in the *Morning Chronicle* in January, 1818, enlarged, corrected, and improved,' 8vo., 1818, which originally appeared in a series of articles in the 'Morning Chronicle.' Sir Philip Francis died after a long and painful illness, occasioned by disease of the prostate gland, at his house in St. James's-square, 22nd December, 1818. He was twice married, the second time after he had reached the age of seventy, to a Miss Watkins, the daughter of a clergyman. By his first wife he left a son and two daughters.

FRANCIS DE SALES. [SALES.]

FRANCIS XAVIER. [XAVIER.]

FRANCISCO, RIO. [BRAZIL.]

FRANCKE, a celebrated German philanthropist, whose life presents a striking instance of the good which an individual may effect. Francke was born at Lubeck, in 1663. He made such rapid progress in learning that at the age of fourteen he was fit to enter the university, where he devoted himself with great application to the study of divinity and the antient as well as modern languages. In 1691 he became professor of oriental languages at the university of Halle, and soon afterwards professor of divinity and pastor of the parish of Glaucha, a suburb of Halle. The wretched state of his parishioners, who were sunk in the most abject ignorance and poverty, gave the first impulse to his philanthropic exertions. He began by teaching the children, whom he supported at the same time by small donations. He took a few orphans to educate; their number rapidly increased, and as he was assisted by the contributions of many charitable persons, he gradually extended the sphere of his beneficial activity, and formed several establishments for the education of all classes. In 1698 he laid the foundation of the orphan asylum, though he had scarcely any means of completing the edifice, but the necessary funds were constantly supplied by charitable persons. It frequently happened that all his funds were exhausted, and that he had not even sufficient money to pay the workmen, when at the very critical moment he received by post large sums from known or unknown benefactors. He was fortunate in finding not only persons who contributed money to promote his undertaking, but many who zealously assisted him in his labours. Francke was a man of mild and cheerful disposition, agreeable manners, and exceedingly laborious. He punctually attended to his academical lectures, and to his clerical duties at Halle as well as in Glaucha: his affairs and extensive correspondence engrossed all the day, and it was only late at night that he could occupy himself with his literary labours, the earnings of which he always devoted to charitable purposes. The greater part of his works were written in German, but he published also some learned works on divinity in Latin. Francke died in 1727, and the following establishments which now exist at Halle owe to him their foundation and bear his name: 1, the Orphan Asylum, in which, since its establishment, 4500 poor orphans of both sexes have been gratuitously educated; 2, the Pedagogium, an institution for the education of young men of the higher and middle classes, founded in 1696; 3, the Latin School, established for the education of children not belonging to wealthy families, and divided into nine classes; 4, German or Burgher Schools for boys and girls; 5, the East India Missionary Establishment; and 6, the Cansteinian Biblical Institution. This last establishment was the forerunner of Bible Societies. It was founded by Baron Canstein, a German nobleman, who, after having spent a part of his life in courts and camps, became by his intercourse with Francke religiously disposed, and by his exertions and the aid of subscriptions established the biblical institution of Halle, in order to promote the reading of the Scriptures among the poorer classes. This institution possesses a number of stereotype plates, from which a certain number of Bibles is continually struck off: this institution has furnished, in the above-mentioned manner, from its establishment in 1712 till 1834, more than two millions of Bibles and above six millions of New Testaments. The profits derived from the sale of those Bibles go to the support of Francke's institutions, which derive a considerable income from lands and other charitable gifts bequeathed to them, chiefly by persons who have been educated there, as well as from a bookselling, printing, and publishing establishment, which is the property of the above-mentioned institutions.

FRANCOA'CEÆ, a very small natural order of Exogens, consisting of the genera Francoa and Tetilla only. They are South American herbaceous plants with lyrate radical leaves and a scapose inflorescence. The sepals and petals are four; the stamens four times as numerous and hypogynous, half of them being rudimentary. The pistil consists of four carpels adhering by their interior angles, with a sessile four-lobed stigma. The seeds are numerous, and contain a minute embryo lying in a mass of fleshy albumen. The station of Francoaceæ in a natural arrangement is unsettled. Rosaceæ and Crassulaceæ seem to be the favourite orders to which they are approximated; but

we rather regard them as a part of the albuminous subclass, serving to connect Papaveraceæ with Droseraceæ and Primulaceæ. [EXOGENS.]



A portion of the flower-stem of Francoa sonchifolia: 1, the stamens and pistil; 2, a transverse section of the ovary; 3, a seed; 4, the nucleus of the seed taken from within the spongy testa; 5, a longitudinal section of the nucleus showing the minute embryo.

FRANÇOIS, CAPE. [HISPANIOLA.]

FRANCO'LIN. [PERDICIDÆ.]

FRANCO'NIA (Franken, or Frankenland), formerly a circle of the German empire, was bordered on the south by Swabia and Bavaria, on the east by Bohemia and the Upper Palatinate, on the north by Hesse and Thuringia, and on the west by the Lower Palatinate and the circle of the Upper Rhine. Its area was about 10,290 square miles, being the smallest circle of the empire, and its population about 1,600,000. It was composed of Baireuth and Ansbach, the four ecclesiastical principalities of Würzburg, Bamberg, Eichstädt, and Deutsch-Orden; the earldoms of Henneberg, Schwarzenberg, Hohenlohe, Werthheim, Erbach, Reineck, Castell, and Limburg; the six towns of the empire, Nuremberg, Schweinfurt, Rothenburg, Weissenburg, and Windsheim; six equestrian cantons, and several villages immediately dependent on the empire. The whole of these, with the exception of the earldoms of Henneberg, Schwarzenberg, and Reineck, were transferred to the crown of Bavaria by various treaties, beginning with that of Luneville in 1801, and closing with the territorial acquisition made by a treaty with Austria in 1819. The soil of Franconia is among the most productive in Germany, yielding an abundance of grain, wine, fruit, and vegetables, and supplies large quantities of cattle. Even the northern parts, where the Thuringian and Fichtelberg mountains occupy a portion of the surface, and render them frequently unfit for agriculture, are highly productive in timber, fuel, and minerals. Those parts excepted, Franconia is a country of plains. The principal river is the Main, into which most of the minor streams discharge their waters; the Werra connects the country with the German Ocean by means of the Weser, while other rivers flow into the Elbe, Rhine, and Danube. The margrave of Brandenburg was the highest authority in the circle. The contingent which Franconia contributed to the army of the empire was 1902 foot soldiers and 980 horse, and its monthly tribute towards the expenses of the empire was 3000 guldens—about 275*l.* sterling.

FRANEKER. [FRIESLAND.]

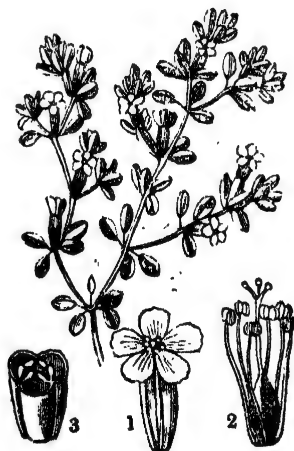
FRANKALMOIGN, a species of tenure. The word signifies 'free alms,' and the tenure is that by which a religious corporation, aggregate or sole, holds lands of the donor, to them and their successors for ever. The services which they were bound to render for their land were not clearly defined, but were only in general to pray for the souls of the donor and his heirs, dead or alive: they did no fealty, which was incident to all other tenures. [FEUDAL SYSTEM.]

The tenure by Frankalmoign was excepted by name in the stat. 12 Car. II., which abolished military tenures, and it subsists in many instances at this day. It is very distinct from all other tenures, being not in the least degree feudal, but merely spiritual; for if the services be neglected, the law gives no remedy by distress or otherwise to the lord of whom the lands are holden, but merely a complaint to the ordinary or visitor to correct it.

Donations by this tenure are now out of use; for since the statute of Quia Emptores (18 Ed. I.), as it is said by Littleton, none but the king can grant lands to be so holden. (2 Bl. *Com.*)

FRANKENBERG, in the bailiwick of Chemnitz, in the kingdom of Saxony, is an agreeable town situated on the Zschopau, and in a picturesque valley: it is well built and regularly laid out, and contains about 450 houses and 5200 inhabitants. Next to Chemnitz it has the largest factories in Saxony for printing cottons, and employs upwards of 600 hands in this branch alone: it also manufactures cottons, linens, and leather, and has extensive bleaching-grounds in the vicinity. The copper-mines near it produce but small quantities of the metal.

FRANKENIA'CEÆ, a small natural order of Exogens, allied to Silenaceæ and Linaceæ, with a procumbent habit, small leaves, and very often minute flowers half hidden among the leaves. They are all furnished with a tubular, ribbed calyx, and that, together with their having five petals, a definite number of hypogynous stamens, and a one-celled capsule bursting into valves, to whose edges the seeds adhere, gives them a distinctly limited character. The species are chiefly found in the south of Europe and north of Africa; they however occur in various other parts of the world; one species from New Holland, Frankenia pauciflora, remarkable for the size of its flowers, is a very pretty greenhouse shrub.



A twig of Frankenia pulverulenta, natural size:—1, a flower; 2, the pistil and stamens; 3, a transverse section of the ovary, all magnified.

FRANKENSTEIN, a circle of the Prussian government of Breslau, and in the province of Silesia: it is a level country, occasionally interspersed with hills, has an area of about 181 square miles, and a population of about 42,300. It is watered by the Neisse, raises much flax, together with wheat, potatoes, and fruit, and is well supplied with timber. The capital of this circle, which bears the same name, is situated on the Pausebach, in 50° 52′ N. lat., and 16° 50′ E. long. It is a well-built town, surrounded by walls, and has four suburbs, an old castle now in ruins, a spacious market-place, a Roman Catholic and a Lutheran church, besides churches attached to the hospital and barracks, a

picture, gallery, botanical garden, seven schools, &c. The population was 4610 in 1817; 5509 in 1831, and is at present about 5700. The manufactures of the town consist of woollen stuffs, linens, leather, stockings, tobacco, liqueurs, &c., and it has a good trade in corn, wine, woollens, &c.

FRANKENTHAL. [RHINE, CIRCLE.]

FRANKFORT on the Main (in German Frankfurt), the capital of a small republic in the western part of central Germany, which has an area of about 91 square miles. It is bounded on the north and north-east by the province of Hanau in Electoral Hesse, on the south-east and south by the province of Starkenberg in Grand-ducal Hesse, and on the west by the duchy of Nassau and part of Grand-ducal Hesse. It is supposed to date its origin from the times of the Merovingian princes. Charlemagne built a palace in the town, in which he held a council of the church in the year 794. Lewis the Pious surrounded it with walls and ditches in 838. In consequence of the treaty of Verdun, by which Aix la Chapelle fell to the share of Lotharius, it became the capital of the empire of the Eastern Franks, and hither Lewis the German transferred the fairs held by the Austrasians. A palace, called the Roemer (Roman palace), was also built here by its sovereigns, who held their courts of ceremony under its roof from time to time, though it was not their fixed abode. In the records of the middle ages Frankfort is mentioned as one of the principal cities in the German empire, and as a mark of distinction was denominated a chamber of that empire (*Reichskammer*), which the emperor William pledged himself, in 1254, should never be mortgaged or alienated; a pledge which made it an immediate dependence of the empire itself. A golden bull confirmed the privilege which Frankfort had long enjoyed, of being the place of all imperial elections. In the early part of the 15th century, the Roemer, which had become the property of one of the burgesses about 50 years before, was purchased and converted into a town-hall by the magistrates, who about this time availed themselves of the prodigality of the German emperors to buy their monopolies and domains in and near the town. The emperor Richard conferred additional immunities on it in 1257; in 1372, Charles IV. sold the bailiffship of the empire to the magistracy; and in 1329, Lewis the Bavarian empowered them to redeem all the properties, tolls, &c., in Frankfort or its vicinity which he or his predecessors might have pawned to others. This right was subsequently turned to very good account by the magistrates. The great Easter fair, in addition to the Michaelmas fair, which had been held since the days of Lewis the German, was instituted in 1330. In 1390 the town acquired the lands on the left bank of the Main, on which Sachsenhausen now stands, by which acquisition it completed its present extent of territory. In 1555 Charles V. endowed it with the right to the free navigation of the Main. The treaty of Westphalia recognized all its immunities, and it was taken under the special protection of the empire by the imperial rescripts of 1682 and 1683. The noblemen who settled in the town and connected themselves with the wealthier class of inhabitants, gradually formed clubs, or exclusive companies, and these societies ultimately engrossed nearly the whole government; but the Congress of Vienna in 1815 put an end to the abuse. The emperor Charles VII. resided here from 1742 to 1744, and the German diets were at that period transferred to Frankfort from Ratisbon. It was the place of assembly for the states of the electorate of the Upper Rhine; and dating from A.D. 753, 21 German diets were held here. Under the settlement of the empire in 1803, called the 'Deputations-recess,' all the ecclesiastical property within the boundaries was made over to the town, on condition of its paying certain annuities to the amount of 34,000 guldens, about 3000*l.* sterling. The arch-chancellor of the empire, who had a large property in the town, became a member of the Confederation of the Rhine established by Napoleon in 1806, accepted the title of 'Prince-Primate,' and was placed at the head of the government; Napoleon reserving to himself the right of nominating his successors. This was a short-lived dignity; for Napoleon, finding it convenient to separate lay from ecclesiastical jurisdictions, put an end to the prince-primacy in February 1810, added the principalities of Fulda and Hanau, with some small exceptions, to the town and territory of Frankfort, erected the whole into the 'Grand Duchy of Frankfort,' and appointed Prince Eugene, viceroy of Italy, its sovereign. This grand duchy contained an area of about 1990 square miles, with a population of about 302,000, a revenue of 3,575,629 guldens, about 295,400*l.* sterling, and had Frankfort for its capital. It fell to pieces with the downfall of its founder, and a resolution of the congress of Vienna on the 9th of June, 1815, re-established the city of Frankfort and its former territory as a free state.

The small extent of territory, which Frankfort possesses beyond its walls, lies immediately round them on both sides of the Main; it is quite level, and its soil, a deep sand covered with a crust of lava, has been at every point brought into a high state of productiveness. It is watered by the Main, and raises corn, though not in quantity sufficient for the consumption; potatoes, vegetables, fruit, and wine; many horned cattle and sheep are also bred. The inhabitants of the eight villages are partially employed in manufacturing and mechanical pursuits within the walls of the city itself; but the most lucrative occupation they follow is that of carriers through many states of Germany. The population in 1811 amounted to 47,372; at present it is estimated at about 55,000, namely, 47,000 in the city and 8000 in the eight villages; of the whole number about 7000 are Roman Catholics and 5200 are Jews. It is composed of burgesses, in whom the sovereignty of the state is vested, domiciliated citizens who are subject to certain restrictions with regard to the application of their industry, and licensed persons, who, in virtue of the payment of a special rate, are allowed to live in the town and exercise certain callings. The Jews have of late years been admitted to enrol themselves in the class of burgesses. The majority of the inhabitants are Lutherans; the numbers of reformed Lutherans being about 3000, Roman Catholics 7000, and Jews 5200. There are 14 Lutheran places of worship (of which 7 are in the town itself), 2 reformed Lutheran, 3 Roman Catholics, and 2 Jewish.

The constitution, promulgated on the 15th May, 1816, and solemnly sworn to on the 18th October following, is democratical, and vests the sovereign power in the burgesses. This power is delegated to three superior authorities: the senate, the permanent committee of burgesses, and the legislative body. The senate is composed of 20 members, with the two burgomasters as its presidents, who are elected annually; the head burgomaster draws up all reports to the senate and has the control of the military department, while the junior controls all affairs relating to the police, the corporation, and criminal proceedings. The senators discharge all the administrative functions, and compose the civic tribunal as well as a secondary court of appeal; the highest court of appeal being the supreme tribunal at Lübeck. The permanent committee is composed of 61 members, and its principal office is to control the income and expenditure. The legislative body consists of 85 members, 20 of whom are senators, and as many are members of the permanent committee; the remaining 45 are chosen from an electoral college of 65 burgesses, elected by the three civic orders; the patrician or men of letters; the merchants, and the tradesmen, mechanics, &c. They are elected for the session only, which opens in November and sits for six weeks; their sanction is requisite to all new laws as well as to the budget. The nine deputies, who are returned by the rural dependencies of Frankfort, do not assist at the deliberations, excepting when matters connected with the interest of their constituents are brought forward. The senate and permanent committee are chosen, as vacancies occur, from among the other members of the legislative body. The Jews were partially emancipated by a regulation of the 1st November, 1824, and admitted into the class of natural born subjects of the state; but they are excluded from taking any part whatever in the administration of its affairs; neither can any Jew possess more than one house and one garden, nor exercise the profession of a notary or attorney at law; nor can more Jews follow a given mechanical pursuit than in the exact proportion of the Jewish to the Christian inhabitants, who are similarly restricted with regard to the number of handicraftsmen. Only 15 marriages are allowed to be celebrated among the Jews in the course of the year.

The public income is estimated at 760,000 guldens, about 66,000*l.* sterling, and the expenditure at rather less. The debt is said to be 8,000,000 guldens, about 700,000*l.*

The armed force is composed of a battalion of troops of the line, 600 strong, and kept up by enlistment; and of the landwehr or militia, which includes all the male inhabitants between the ages of 19 and 60, and consists of two squadrons of light-horse, a company of artillery, a battalion

each of carabineers, chasseurs, and firemen, six of infantry, and a veteran corps composed of citizens between the ages of 50 and 60.

The Lutherans have a consistory, and the reformed Lutherans two presbyteries, which manage the revenues of the churches and direct all ecclesiastical affairs. The Roman Catholic clergy and flocks are comprehended in the diocese of the bishop residing at Limburg on the Lahn.

Frankfort is a member of the German Confederation, and in conjunction with the other free towns, Lübeck, Bremen, and Hamburg, occupies the 17th place in the limited council of the diet, but enjoys its independent vote in the full council. It furnishes a contingent of 479 men to the army of the confederation, and pays a quota of 500 guldens (about 44*l.*) towards the annual expenses of that body.

FRANKFORT (on the Main). The city of Frankfort is on the right bank of the Main, across which there is a stone bridge which unites it with the suburb of Sachsenhausen. It lies in 50° 6′ N. lat. and 8° 36′ E. long. The valley and the town are commanded on the north by the gentle heights of the Rœdenberg, and at some leagues distant behind them by the range of the Taunus; and on the side of Sachsenhausen, in the south, by the Mühlberg, Sachsenhäusenberg, and Lerchesberg, offsets of the Odenwald. The old walls and ramparts with their stagnant ditches were razed between the years 1806 and 1812, and the site converted into spacious park-like grounds; the glacis too is now covered with vineyards and gardens, which are externally bounded by a broad road; and beyond this road the adjacent ground is embellished with a profusion of villas, pavilions, and private gardens. Frankfort itself is about 1830 paces in length along the Main, 1380 in width, and 4000 in circuit; Sachsenhausen is about 1200 in length, but of inconsiderable breadth.

The principal public entrances are nine large gates, which formerly ran between cumbrous quadrangular towers: most of these have in modern times been replaced by handsome buildings, modelled from the antient temples of Athens and Rome, &c. Of the nine entrances Frankfort has seven and Sachsenhausen two. In front of the north-eastern entrance is the monument erected by Frederick William II., king of Prussia, to the memory of the prince of Hesse-Phillipsthal and his gallant followers, who fell at the successful storming of the town on the 2nd December, 1792: it consists of a quadrangular block of German marble, surmounted with appropriate trophies, bearing a commemorative inscription, and resting on an artificial rock. The Bockenheim gate, which is the western entrance, is built on the model of the temple of Apteral Victory at Athens, and the Upper-Main gate, on that of the porches of the Campus Militum at Pompeii. The adjacent buildings are neat structures appropriated as guard-houses and for the use of the custom-house officers. The Eschenheim gate, the north-western entrance, is the only specimen extant of the antient gates; it is a lofty massive tower, crowned by five turrets, and is a fine specimen of the German architecture of the fourteenth century.

Frankfort, inclusive of Sachsenhausen, contains nearly 4000 houses; between 400 and 500 of them being in the latter suburb. They form 6 large and 14 minor squares or open spaces, and above 220 streets and lanes, and have 115 fountains and walls. The places of worship are 17 in number; namely, 7 Lutheran, 2 Reformed-Lutheran, and 3 Roman Catholic churches, 3 chapels for Lutherans, and one meeting house for the Herrnhuthers, and one synagogue.

The city is divided into 14 quarters, numbered from A to O, 12 within the walls, and 2 in the Sachsenhausen suburb. The Belle Vue and other streets, built along the Boulevards, which form a handsome screen to the more antient part of Frankfort, have been erected since the fortifications were demolished. The largest square, called the Rossmarkt (Horse Market) is surrounded by fine buildings, and connected with the square of the theatre by a spacious avenue of lime trees and acacias. There are fountains in the centre of the Horse Market as well as in the squares of the Liebfrauen and Roemerberg. The right bank of the Main, from the upper to the lower gate, which is nearly the whole length of the city, is edged by a spacious quay, and behind this lies an uninterrupted line of buildings. During the fairs, a portion of the quay, on which rows of booths are erected, presents a scene of the most animated description.

The most remarkable buildings in the town are the 'Roemer' or Guildhall, an irregular structure, with lofty roofs in the old Frankish style. Under its roof are the Wahlzimmer, or Hall of Election, a spacious and handsomely furnished apartment, in which the electors and their representatives were wont to assemble and partly conduct the business of electing the emperors of Germany. It is now used for the meeting of the senate. Next to it is the Kaisersaal, or Imperial Hall, where the emperor, upon his election, held his public dinner, at which he was waited upon by the counts and the high officers of the empire. There are niches in this hall which contain portraits of the emperors of Germany from Conrad to Leopold II.; but there was not one left unoccupied for receiving the portrait of Francis II., the last of those sovereigns. A sort of ante-hall, with a painted cupola, and furnished with specimens of the pictorial talent of the Frankforters, opens into the Election Hall. Here is also the Depository of the Archives, surrounded by walls six feet in thickness. It contains, among other valuable records, the celebrated 'Golden Bull,' promulgated by Charles IV. in 1356, which is written on 45 sheets of parchment. The Roemer is situated on the western side of the Roemerberg, an irregular open space or square, which has also much of historical interest attached to it. This is the spot where the people collected to welcome the newly-elected emperor, bearing his crown and sceptre in solemn procession, after he had been anointed in the cathedral.

Not far from the Roemer is the new Hall of Justice with its various courts and offices; and south of it, on one side of the Fahr-gate on the quay of the Main, stands the Saal Hof, on the site of a palace built by Lewis the Pious, Charlemagne's son, in which Charles the Bald was born and Lewis the German long resided, but of which scarcely any part is extant, save the Chapel of St. Elizabeth, a vaulted chamber with columns of red sandstone, and walls six feet in thickness. The present building, which is private property, was raised in 1717. The Braunfels belongs to one of the old equestrian clubs; the court-yard is used for the Exchange, and the spacious saloons on the first floor are occupied, in the fair times, by dealers in all kinds of luxuries, &c., and are the favourite lounge for visitors. The palace of the prince of Tour and Taxis, in the north-western part of Frankfort, is a spacious structure in the French style of 1730, richly adorned with paintings, sculptures, and antient hangings: it contains 150 apartments, including two octagonal halls, and is the spot where the diet of envoys from the states of the German Confederation hold their sittings. The antient House of the Teutonic Knights in Sachsenhausen, is a sombre massive building in a low situation, but well laid out in its internal arrangements. It is at present the property of the emperor of Austria.

The two large buildings in Frankfort, which were once public arsenals, were stripped of their contents by the French, and are now appropriated to the police as a prison and for other purposes. The guard-house, which is chiefly used as a prison, is an unsightly structure of the early part of the sixteenth century, which disfigures the Parade. An old Carmelite convent, now the quarters of the garrison of the town, has cloisters covered with faded fresco paintings executed in the beginning of the sixteenth century; the Stone House, near the Roemerberg, is a fine remnant of the middle ages, and the Fürsteneck, near the bridge, may be instanced as one of the oldest buildings in Frankfort. Besides these, the theatre, public library, academy of arts and sciences, the new hospital of the Holy Ghost, a Jews' hospital, and an orphan asylum, are deserving of attention.

The church of St. Bartholomew, formerly the cathedral, is in the shape of a Roman Cross, of the Gothic order, and though begun in the time of the Carlovingian princes, was not finished until the middle of the fourteenth century. Its colossal tower, 160 feet in height, is one of the latest models of the Gothic. The colossal statue of the patron saint in this church is reckoned a masterpiece of sculpture. On the right of the grand choir is the chapel, in which the electors accepted the German emperor elect as their sovereign after he had been crowned and anointed at the high altar. The tower was begun in 1415, and was finished in 1509. At a short distance north of the town, is the public cemetery, laid out like a pleasure ground of shrubs; and adjoining it an equally well arranged burial place for the Jewish community. There are four hospitals, one of which is for lunatics and epileptic persons; an orphan asylum, a house of refuge for sick poor, and several other benevolent in-

stitutions. Among the scholastic establishments are a gymnasium of six classes, conducted by a director, six professors, and nine masters; a normal school of 13 classes, 7 for boys and 6 for girls, and a variety of other seminaries. The public library contains about 60,000 volumes, among which are a complete collection of works relating to German history, and many rare MSS., early editions, and engravings.

The scientific institutions of Frankfort comprise a Medical Institute, founded in 1763 by the liberality of Dr. Senkenberg, which is composed of a medical library, an anatomical theatre and lecture-rooms, and botanical garden. The Senkenberg Society of Naturalists was united to this establishment in 1817, and in the adjoining buildings possesses an extensive museum, to which Rüppell, the explorer of north-eastern Africa and the parts adjacent, who travelled partly at the society's expense, has contributed several valuable collections in natural history. Frankfort also possesses a philosophical society, a society of the useful arts, which has a mechanics' school; a society of industry; Stædel's Institute of the fine arts, which possesses a choice collection of paintings, &c., bequeathed by the founder, who left an endowment for lectures and instruction in such branches of knowledge as are connected with the fine arts; a school of design, a society for the fine arts, the Bethmann museum of antiques, a society for encouraging the study of the German language, &c. Dr. Senkenberg also endowed the town hospital. The libraries of the cathedral and the Dominicans are also rich in rare MSS. and old editions. There are twenty-two booksellers' establishments, fourteen printing-houses, and three type-foundries in Frankfort.

With regard to the present amount of the population, we have no official returns before us; by some writers it is estimated as low as 43,000, and by others as high as 48,000. It is certain however that it decreased considerably between 1817 and 1825; for in the first of these years it was officially stated to be 47,830, and in the last 41,582, including 10,360 males and females not born in the town.

With the exception of Sachsenhausen and its 5000 inhabitants, who are principally agriculturists, gardeners, and day-labourers, the citizens of Frankfort derive their subsistence from commerce, money operations, and manufactures. It is a place of considerable transit for German and foreign produce. The chief articles of trade are wines, English, French, and Italian goods, Bavarian timber, German wools, colonial produce, and German manufactures. The old anagram, 'Fanum mercatorum fundo,' (I found a temple of traders), well indicates the sources of its prosperity. The fairs, held at Easter, and in August or September, are no longer what they were in the sixteenth century, when they were frequented at times by as many as 40,000 strangers; but they still afford an animating and attractive scene. The chief manufactures are carpets, galloon, tobacco, cards, cottons, silks, printer's black, &c.

FRANKFORT, a government circle forming the eastern part of the province of Brandenburg in Prussia, is bounded on the north by Pomerania, and on the south by the kingdom of Saxony. It contains an area of about 7502 square miles, is divided into 18 minor circles, has 67 towns, 7 market-villages, and upwards of 1700 villages and hamlets, and the number of inhabitants is about 706,000, independently of the military. The soil, particularly in the south, is a deep and richly-productive sand. There are numerous woods and forests, which occupy a fourth part of the surface. The rivers which water the circle are the Oder, Neisse, Warthe, Obra, Pleiske, &c. It produces much grain, flax and hemp, hops, tobacco, timber, &c.; and there are rich meadows in the vicinity of the rivers, on which, in 1831, were fed 68,014 horses, 276,355 horned cattle, and 916,698 sheep and goats.

FRANKFORT, the capital of the government circle, as well as of a minor circle of the same name, is a town pleasantly situated on the left bank of the Oder, and surrounded on the land-side by vine-clad heights and gardens: in 52° 22′ N. lat., and 14° 46′ E. long.; at an elevation of 116 feet above the level of the sea, and at a distance of about 48 miles south-east of Berlin. It is regularly built, encircled by walls with towers, five gates, and a ditch, and has three suburbs, one of which, the Damm, lies on the left bank of the Oder, which is traversed by a bridge of wood. The number of houses is about 2450, and of the population about 22,000, besides the military: in 1817 it was 13,892. It has a market-place and six Protestant churches, a Roman Catholic chapel, and a synagogue. The Upper Church has some fine windows of painted glass. The university, founded here in 1506, was transferred to Breslau in 1810. Frankfort possesses a gymnasium with a library, an upper or grammar-school, and nine schools for the inferior classes, an obstetric seminary, an orphan asylum, two hospitals, a house of correction, and a free school for 300 soldiers' children, founded in memory of Leopold, duke of Brunswick, who lost his life here in April, 1785, while endeavouring to save a man from drowning. A monument was also erected to him at the eastern end of the bridge across the Oder. In front of the Guben gate is a three-sided pyramid, resting on a block of stone, which was raised by the freemasons' lodge in 1776, to the memory of Kleist, the poet, who fell in the battle of Kunersdorf. The manufactures of the town consist of wines, mustard, brandy, tobacco, sugar, gloves, stockings, linen, leather, &c.: its trade is extensive, and the three periodical fairs, instituted in 1253, are well frequented, particularly by Polish dealers. The inhabitants are engaged also in the navigation of the Oder, on which above 2000 vessels and craft annually pass Frankfort.

FRANKFORT, in America. [KENTUCKY.]

FRANKINCENSE, Common, is the produce of the Abies excelsa (Dec.), the Pinus abies (Linn.), common spruce fir, from which it either exudes spontaneously or more abundantly from incisions of the bark. When it first flows out, it is liquid, but on exposure to the air concretes, and is collected during autumn and winter. It occurs in two states, in tears (Thus, or Olibanum sylvestre), and in large irregular lumps, or compressed cakes. When recent, the colour should be white, or only inclining to yellow, subdiaphanous, soft, tenacious, and glutinous: by the action of time it becomes hard, and even friable, the colour having deepened into an orange hue. By the heat of the hand it softens, and by a higher temperature liquefies. It possesses a turpentine-like odour and taste. It is insoluble in water, but completely soluble in alcohol with the aid of heat.

It consists of two kinds of resin mixed with oil of turpentine. By melting it in water, and straining it through strong cloths, it is deprived of much of its oil, when it is termed pix arida, or Burgundy pitch.

It is scarcely now used internally, but is irritant and diuretic. Externally it is rubefacient, and consequently enters into the composition of many plasters.

For the genuine Thus, or frankincense of the antients, see BOSWELLIA; also OLIBANUM, as the substances distinguished by this name (derived from the Arabic *looban*) were of different kinds, and procured probably from Africa and Arabia, as well as from India.

FRANKLIN. [MISSOURI.]

FRANKLIN. In the reign of Elizabeth a franklin was a freeholder, or yeoman, a man above a vassal or villain, but not a gentleman. He is mentioned as of this description in several passages of Shakspeare's plays. In earlier times he was a personage of much more dignity, and seems to have been distinguished from a common freeholder by the greatness of his possessions. Chaucer's franklin was a rich and luxurious gentleman, a chief man at the sessions, and had been sheriff, and frequently knight of the shire.

> An housholder, and that a grete was he;
> Seint Julian he was in his contree.
> His brede, his ale, was alway after on;
> A better envyned man was no wher non.
> Withouten bake mete never was his hous,
> Of fish and flesh, and that so plenteous,
> It snewed in his hous of mete and drinke,
> Of alle deintees that men coud of thinke,
> After the sondry sesons of the yere,
> So changed he his mete and his soupere.
> Ful many a fat partrich hadde he in mewe,
> And many a breme, and many a luce in stewe.
> Wo was his coke, but if his sauce were
> Poinant and sharpe, and redy all his gere.
> His table dormant in his halle alway
> Stode redy covered alle the longe day.
> At sessions there was he lord and sire.
> Full often time he was knight of the shire.
> An anelace and a gipciere all of silk,
> Heng at his girdel, white as morwe milk.
> A shereve hadde he ben, and a contour.
> Was no wher swiche a worthy vavasour.'

Fortescue, 'De Legibus Angliæ,' c. 29, describes the franklin as 'Pater familias—magnis ditatus possessionibus.' (Nares's *Glossary in voce*; Tyrwhitt's *Notes on the Canterbury Tales*, 4to., Oxf., 1798, vol. ii. p. 402.)

FRANKLIN, BENJAMIN, born at Boston, in New England, January 6, 1706, was the son of a tallow-chandler in humble circumstances, but intelligent and strong-minded As a boy he had a great desire to go to sea; but he also dis-

played a fondness for reading, which induced his father to apprentice him to another son, who was a printer at Boston. His love of books, which he had now more means of indulging, weaned him from the love of the sea; and he practised great abstinence and self-denial, the better to improve his opportunities of study. At the same time he made himself an able workman. The two brothers however did not agree: the elder used an undue severity, which the younger, as he himself says, did something to provoke by his impertinence. These quarrels led to a step, which, with his usual candour, Franklin has plainly related, and declared to have been dishonourable. His indentures had, for certain reasons, been cancelled, under a private agreement that he should continue to serve for the full period of apprenticeship. A new quarrel arising, he took advantage of the letter of the law, and declared his resolution to quit his brother's service. The printer took care so to represent this matter that Benjamin was unable to find employment in Boston. He therefore went away secretly, without the consent of his parents, in 1723, and after a vain trial to find work at New York, engaged himself to an obscure printer in Philadelphia, named Keimer. There he lived frugally and creditably for a year and a half: but being induced by deceptive promises of patronage to think of setting up for himself as a master printer, he sailed for England, in the beginning of 1725, to purchase the necessary stock in trade. On his arrival he discovered that a cruel fraud had been practised, inasmuch as his pretended friend had neither the power nor the wish to help him; and being destitute of money or credit, he again found employment as a journeyman printer in London. His own account of this portion of his life, which offers an admirable example of frugality and industry, will be read with pleasure. Having gained the good will of Mr. Denham, a merchant of Philadelphia, he returned thither as that gentleman's clerk, in July, 1726. He now considered his prospects to be promising: but in 1727 Mr. Denham died, and Franklin being unable to do better, returned to his old trade and his old master, Keimer. In the course of two years he gained credit and friends to enable him to set up in business on his own account; and September 1, 1730, he married a young woman to whom, before his voyage to England, he had been attached.

Franklin had early renounced Christianity, nor does it appear, though he has unequivocally recorded his belief in God and in a future existence, that he ever again gave credence to revealed religion. About this time however a great change took place in his views. In London he had written a pamphlet to prove (we quote his words) 'from the attributes of God, his goodness, wisdom, and power, that there could be no such thing as evil in the world; that vice and virtue did not in reality exist, and were nothing more than vain distinctions.' Reflection on the conduct of other free-thinkers, by whom he had suffered, and on some parts of his own life, which he has candidly related and condemned, brought him to a different way of thinking; and, he says, 'I was at last convinced that truth, probity, and sincerity in transactions between man and man were of the utmost importance to the happiness of life; and I resolved from that moment, and wrote the resolution in my journal, to practise them as long as I lived.' This resolution he fully kept. His honesty and straightforwardness have passed unquestioned, even by the numerous enemies whom his religious and political opinions raised against him.

Unceasing industry, business-like habits, a large fund of disposable talent, general information, and readiness in the use of his pen, either for amusement or instruction, gradually secured to Franklin a large circle of friends, and raised him from poverty to affluence. He engaged in literature; edited a newspaper, wrote a pamphlet to advocate a paper currency; and in 1732 projected 'Poor Richard's Almanac,' of which the distinguishing feature was a series of maxims of prudence and industry, in the form of proverbs. It was continued for 25 years, and is said to have reached a circulation of 10,000 annually. These maxims, collected in one piece, called 'The Way to Wealth,' obtained uncommon popularity, and have been translated into various languages.

Franklin's turn of mind was eminently practical. He said with truth, 'I have always set a greater value on the character of a *doer of good* than on any other kind of reputation.' Not that he joined in the vulgar prejudice of setting theory and practice in opposition, for he was bold, speculative, and inquiring in physical as well as in metaphysical science. But science in his hands always bore fruit directly applicable to the uses of common life; and while he never neglected his own affairs, industry and economy of time enabled him to originate, or take an active part in supporting, a variety of projects for the public good. A list of the chief of them will show, shortly and clearly, to what sort of objects his benevolent exertions were directed.

1732. Set on foot and procured subscriptions for the first public library, incorporated in 1742 by the name of 'The Library Company of Philadelphia.'

1738. Established the first association for extinguishing fires; and, at a later period, the first Fire Insurance Company.

1749. Raised subscriptions for the foundation of a public academy, the schools of Pennsylvania being few and bad. This was the origin of the present university of Pennsylvania.

1752. Raised subscriptions and procured an auxiliary grant from the legislature to establish the first hospital in Philadelphia; a scheme suggested in the first instance by a physician of the city, who had not influence enough to work it out.

1754. Proposed a plan for a union of the American provinces against invasion, in which a germ of the future Union may be found. It was kept alive, he used to say, like all good notions, though not carried into effect at the time. It was approved by a species of congress from six of the provinces, but rejected both by the colonial assemblies and the British government.

He was also a zealous member of several societies; among them, of the Philadelphia Society for the Improvement of Prisons, and the Pennsylvanian Society for the Abolition of Slavery, both founded in 1787.

As a philosopher, his name is indissolubly linked with the history of electricity, in which he was one of the most active, patient, and successful experimenters; and his industry was rewarded by that brilliant discovery, the corner stone of his scientific fame, of the identity of the electric fluid and lightning. His attention was first turned this way in 1745, the science being then in its infancy, by the transmission of an electrical apparatus to Philadelphia, for the purpose of having the experiments which had attracted so much notice in Europe repeated in America. In 1747 he sent a series of letters to England, in which he noted the power of sharp points both to attract and to give out electric matter; and explained his theory, that instead of the phenomena observed being produced by two different electric fluids, they arose from the effort made to restore an equilibrium when one body was overcharged, and another undercharged, with electricity. A body in the former state he called positively, in the latter state negatively electrified. This theory he used to explain the action of the Leyden jar; and though not universally admitted, [ELECTRICITY, p. 336,] it at least furnishes a simple and satisfactory explanation of the phenomena of the science. (*Library of Useful Knowledge*, 'Electricity,' sect. 49.) In 1749 he had conjectured the identity of lightning and electricity, and suggested the idea of protecting houses by pointed conductors, but did not prove it till 1752. He was waiting for the erection of some lofty building, upon which an insulated iron rod might be placed, in hope that on the passage of a thunder-cloud overhead, sparks might be taken from the rod, as from a charged conductor, when it occurred to him that by flying a kite, pointed with iron, during a thunder-storm, the matter of lightning might, if his views were correct, be drawn down the string. He tied a key to the end of the hempen string, insulated the whole apparatus by adding a piece of silk to the end next the hand; and the experiment succeeded. Sparks were taken from the key, a Leyden jar was charged, and the phenomena exhibited were identically the same as if an electrical machine had been used instead of the kite. He varied the experiment by fixing an insulated iron rod at the top of his house; and immediately proceeded to turn his discovery to account by publishing a plan for defending houses from lightning by the use of pointed conductors.

His character, in reference to this branch of his pursuits, has been described in the following terms by Sir H. Davy: 'A singular felicity for induction guided all his researches, and by very small means he established very grand truths. The style and manner of his publication (on Electricity) are

almost as worthy of admiration as the doctrine it contains. He has endeavoured to remove all mystery and obscurity from the subject. He has written equally for the uninitiated and for the philosopher; and he has rendered his details amusing as well as perspicuous, elegant as well as simple. Science appears in his language in a dress wonderfully decorous, the best adapted to display her native loveliness. He has in no instance exhibited that false dignity by which philosophy is kept aloof from common applications, and he has sought rather to make her an useful inmate and servant in the common habitations of man, than to preserve her merely as an object of admiration in temples and palaces.' (*Life*, by Dr. Davy.)

To Franklin's other scientific labours we can only allude. They treat of many branches of meteorology, maritime phenomena, shipbuilding and various subjects connected with navigation, as the Gulf Stream, and the effect of oil in stilling waves; of the proper construction of stoves and chimneys, which, to use a common phrase, seems to have been one of his hobbies; of the art of swimming, which, being himself an excellent swimmer, he was anxious to recommend as a universal branch of education: subjects consonant to his practical character, and most of them directly applicable to the increase of human comforts. Papers on these matters nearly fill the second volume of his collected works; his electrical treatises and letters occupy the first volume, and his moral, historical, and political writings the third.

To return to Franklin's private history; the increasing estimation in which he was held, was manifested in his successive appointments to different offices. In 1736 he was made clerk to the General Assembly of Pennsylvania; in 1737, postmaster of Philadelphia; in 1747 he was elected as one of the representatives of Philadelphia in the Assembly; in 1753 he was appointed deputy postmaster-general for the British colonies.

When he first became a member of Assembly, that body and the proprietary governors, Penn's representatives [PENNSYLVANNIA], were in hot dispute, chiefly with respect to the immunity from taxation claimed by the latter. In this Franklin took an active part. 'He was soon looked up to as the head of the opposition, and to him have been attributed many of the spirited replies of the Assembly to the messages of the governors. His influence in that body was very great. This arose not from any superior powers of eloquence; he spoke but seldom, and he never was known to make any thing like an elaborate harangue. His speeches often consisted of a single sentence, or of a well told story, the moral of which was always obviously to the point. He never attempted the flowery fields of oratory. His manner was plain and mild. His style in speaking was like that of his writings, simple, unadorned, and remarkably concise. With this plain manner, and his penetrating and solid judgment, he was able to confound the most eloquent and subtle of his adversaries, to confirm the opinion of his friends, and to make converts of the unprejudiced who had opposed him.' (*Life*, p. 115.) Having thus shown his talents, he was sent to England in 1757, on the part of the Assembly, to manage the controversy before the privy council; and was successful: it was decided that the estates of the proprietaries ought to pay their fair proportion of the public burthens. He remained in England after this question was settled, as agent for Pennsylvania; and his conduct was so highly approved that Massachusetts, Maryland, and Georgia, severally appointed him their agent. By this time his name was well known to European philosophers. He was chosen a member of the Royal Society, and of several foreign scientific bodies at a later period; in 1772 he was made a foreign associate of the Académie des Sciences, and the universities of Oxford, Edinburgh, and St. Andrews, admitted him to the degree of D.C.L. On his return to America in 1762, he received the thanks of the Assembly, 'as well for the faithful discharge of his duty to that province in particular, as for the many and important services done to America in general during his residence in Great Britain.'

Being re-elected a member of Assembly, Franklin was earnest in endeavouring to procure a change in the government, by vesting directly in the king those rights and powers, which were held mediately by the proprietaries, to the injury, as he thought, of the community. Party spirit ran high on this point; and the friends of the proprietaries had influence enough to prevent his election in 1764. On the meeting of the Assembly, however, he was re-appointed provincial agent in England. He was a warm opponent of the Stamp Act: and his examination at the bar of the House of Commons in 1766, when the repeal of that unhappy measure was proposed, shows the minuteness, variety, and readiness of his information. (See his works, vol. iii., p. 245.) In the outset of the contest he seems to have been truly desirous of effecting a reconciliation between the mother country and the colonies. The rough treatment which he experienced in the course of his negotiations is reported to have changed his temper. That he should have been deprived of his postmastership, is not wonderful. On one occasion, before the privy council, being assailed by Wedderburne, then solicitor-general, in a torrent of gross personal abuse, which was received with evident pleasure by the council, he bore it in silence, and apparently unmoved. On changing his dress, however, he is reported to have said, that he never again would wear that suit till he had received satisfaction for that day's insult. His next appearance in it was on the day when, as minister of the United States, he signed the treaty by which England recognized the independence of the colonies.

In 1775, having lost all expectation of bringing about a reconciliation, he returned to Philadelphia; and the day after he landed, was elected a delegate to the Congress then assembled in that city. His character and services marked him out for the most important employments during that and the following year: among them he was sent on a fruitless mission to persuade the Canadians to join in the insurrection; and was appointed president of the convention assembled at Philadelphia, for the purpose of remodelling the government of Pennsylvania. Towards the end of 1776 he was sent to France, where in conjunction with his brother minister, Silas Deane, he succeeded in inducing the French government to form an offensive and defensive alliance with the United States, February 6, 1778. Having made several journeys to the Continent in his former visits to Europe, he was already known in person as well as by reputation to the scientific and literary men of France, by whom he was received with the highest marks of respect. Nor did his political engagements prevent his bestowing some share of his attention on science. He bore a part in exposing the impudent frauds practised under the name of animal magnetism. In 1785 he was recalled, at his own wish, and was succeeded by Jefferson. Soon after his return he was chosen member of the supreme executive council for the city of Philadelphia, and in a short time was elected president of the same. In 1787 he was delegate for the state of Pennsylvania, in the convention appointed to revise and amend the Articles of Union, and his last political act was an address to his colleagues, entreating them to sacrifice their own private views, for the sake of unanimity in recommending the new constitution, as determined by the majority, to their constituents.

After enjoying, through a long life, an unusual share of health, the just reward of temperance and activity, Franklin was compelled in 1788 to quit public life, by the infirmities of age. But he still retained his philanthropy undiminished, and his intellect unclouded; and his name appears, as president of the Abolition Society, to a memorial to Congress, dated February 12, 1789, praying them to exert the full extent of power vested in them by the constitution in discouraging the traffic in men. This was his last public act. Still he preserved his liveliness and energy, during those intervals of ease which a painful disease, the stone, afforded to him. This however was not the proximate cause of his death. He was carried off, after a short illness, by a disease of the lungs, April 17, 1790, aged 84.

Dr. Franklin's published works were collected in three volumes, with his fragment of his own life, continued by Dr. Stuber, prefixed. He bequeathed his papers to his grandson, William Temple Franklin, by whom, after long delay, an excellent 'Life of Franklin,' including many of his miscellaneous writings, and much of his correspondence, has been published. The *Biog. Universelle* contains a long memoir of him by Biot. (For some remarks as to a particular paper left behind him by Franklin, see Tucker's *Life of Jefferson*, vol. i. p. 338).

FRANKLINITE, a mineral which occurs in attached crystals, granular and massive. The primary form of the crystal is a cube; its colour is deep iron-black. Opaque. Lustre metallic. Specific gravity 4·87, 4·09. Hardness

6·0, 6·5. Streak deep red-brown. Cleavage parallel to the planes of the regular octahedron, but very indistinct. Fracture conchoidal. Magnetic, but without polarity.

The massive varieties are amorphous. Structure granular, compact. This mineral is found at Franklin, New Jersey, North America.

According to Berthier it consists of,—

Peroxide of iron	66
Oxide of zinc	17
Red oxide of manganese	16
	— 99

FRANKS. [FRANCE.]

FRASCA'TI, a town of the Campagna, eight miles east-south-east of Rome, situated on the north-west slope of the Tusculan Mount. On the summit of the mountain, which is 2000 feet above the sea, and about two miles above Frascati, are the ruins of antient Tusculum, a town of Latium, built long before Rome, and often mentioned in Roman history. After the subjection of Latium to Rome it was governed as a municipium. Several distinguished Roman families, such as the Mamilia and the Porcia, came from Tusculum. It was a strong place, both from its position and the solidity of its walls, which enabled it to resist the attack of Hannibal. Tusculum continued to exist after the fall of the empire, being under the rule of its counts till the end of the twelfth century, and was the residence of several popes, among others Alexander III. In 1169 the Tusculans fought and defeated the Romans; but in 1191 the Romans took Tusculum, and destroyed it. Remains of the walls of houses, and of the citadel, are still extant, as well as a small theatre, and a curious crypt, with a kind of arched roof of primitive construction. (Gell's *Topography of Rome and its Vicinity*.) The hill of Tusculum is volcanic, and is separated from the central mass of the Alban mount by the Alban valley, through which runs the Via Latina.

After the destruction of Tusculum, the inhabitants built themselves huts on the lower slope of the hill towards Rome, and covered them with 'frasche,' boughs of trees, from which the modern town has taken its name. It has some good buildings, 4000 inhabitants, and is a bishop's see. The air is wholesome, the place being above the region of the malaria, and the country around is planted with fine trees. But its villas form the great attraction of Frascati, it being a place of resort of the Roman nobility and cardinals in the summer and autumn. One of the most splendid of these residences is the Villa Aldobrandini, called also Belvedere, adorned with numerous fountains, and water-works, and paintings. The villas Taverna and Mondragone, belonging to the Borghese family, the Villa Bracciano, with frescoes by Dominichino, the Villa Conti, with its fine groves, the Villa Falconieri, and others, are also worthy of attention. The site of the Tusculanum of Cicero is not exactly known; some believe it to have been near Grotta Ferrata, on the road from Frascati to the Alban lake; others place it near La Rufinella, on the hill of old Tusculum. There are remains of antient buildings all about this neighbourhood. Grotta Ferrata is an abbey of Basilian monks, established in the eleventh century, who retain the Greek liturgy. The church is adorned with fine frescoes by Dominichino; and the convent has a library, with many Greek manuscripts. (Valéry, *Voyages en Italie*; Mattei, *Memorie Storiche dell' antico Tuscolo oggi Frascati*.)

FRATRICELLI, or Little Brethren, also called *Fratres de paupere vitâ*, a religious sect which arose in Italy towards the end of the thirteenth century. They were Franciscan monks who separated themselves from the grand community of St. Francis with the intention of obeying the laws of their founder in a more rigorous manner than they were observed by the other Franciscans. They accordingly renounced every kind of property, both common and individual, and begged from door to door their daily subsistence, alleging that neither Christ nor his Apostles had any possessions, either individual or in common; and that these were the models which St. Francis had commanded them to imitate. They went about clothed in rags declaiming against the vices of the pope and the bishops, and foretold the reformation of the church and the restoration of the true gospel of Christ by the real followers of St. Francis. As the Franciscan order acknowledges for its companions a set of men who observe the third rule prescribed by St. Francis, and were therefore commonly called Tertiarii; so likewise the order of the Fratricelli, who were anxious to be considered as the only true followers of St. Francis, had a great number of Tertiarii attached to their cause. These Tertiarii, or half monks, were called in Italy *Bizochi* or *Bocazoi*, in France *Beguins*, in Germany *Begwards* or *Beghards*. This last appellation was generally applied to them. The Tertiarii differed from the Fratricelli, not in their opinions, but only in their manner of living. The Fratricelli were real monks, subject to the rule of St. Francis, whilst the Bizochi or Beghards, as well as the Franciscan Tertiarii, excepting their dirty habits and certain maxims and observances which they followed in compliance with the rules of their patron saint, lived after the manner of other men, and were therefore considered as laymen. The Beghards were divided into two classes, the *perfect* and the *imperfect*. The first lived on alms, abstained from marriage, and had no fixed dwellings; the second had houses, wives, and possessions, and were engaged in the common avocations of life like other people. Pope Celestin V. was favourably disposed to the Fratricelli, and permitted them to constitute themselves into a separate order. They were submissive to that pope, but they violently opposed his successor, Boniface VIII., and subsequent popes who persecuted their sect. The Fratricelli were accused of great enormities, and persecuted by the court of Rome, but they found protection from princes, nobles, and towns, who respected them on account of the austerity of their devotion. The Fratricelli did not always submit with the meekness of the first Christian martyrs to their persecutors, but frequently opposed force to force, and even put to death some inquisitors in Italy. This sect continued during the fourteenth century, and spread as far as Bohemia, Silesia, and Poland. The members of it were most severely persecuted in the fifteenth century, and many of them fled from France to England and Ireland. All the persecutions directed against the sect did not however extinguish it, and some remnants of it existed till the reformation of Luther, whose doctrines they embraced. Their name is supposed to have been derived from *Fratricellus* or *Fraterculus*, an Italian nickname which was applied in the middle ages to all persons who, without belonging to any religious order, assumed a sanctimonious appearance.

FRAUNHOFER. [OPTICS, PRACTICAL.]

FRAUSTADT. [POSEN.]

FRA'XINUS, the genus under which the common ash is comprehended, is a collection of arborescent plants inhabiting various parts of the more temperate regions of the northern hemisphere, both in the old and new world, but unknown in a wild state in the southern. Although, if strictly limited, the species are destitute of corolla, yet the genus does, in fact, belong to the natural order of the olive and lilac, a transition to which is afforded by what are commonly called flowering ashes, the Orni of modern botanists, in which a corolla exists in the form of four long narrow petals. Both these genera have the kind of fruit called a key, or technically, a 'samara,' that is, a seed-vessel which does not open, which contains one or two cells, and which is prolonged into a thin wing at the apex. As they are all called ashes in the gardens, and are exceedingly nearly related to each other, we notice them both in this place.

1. Fraxinus, or *True Ashes.*

Of these the most important is the common ash, or *Fraxinus excelsior*, a tree inhabiting the cooler parts of Europe from Great Britain to a considerable distance through Asia. It is said to exist in Japan in a wild state, but this requires confirmation; it does not occur in North America, but species similar to it in appearance are common on that continent. The ash is one of the most useful of our British trees on account of the excellence of its hard tough wood, and the rapidity of its growth. In its appearance too it is singularly graceful for a European tree, often resembling in its slender stems and thin airy foliage the acacias of tropical regions. Every one who has seen the beautiful effect of the ashes mingled with the ruins of Netley Abbey, near Southampton, must have been struck with this peculiarity. The principal objection to the ash is the injury it does to the plants which grow in its neighbourhood, by rapidly exhausting the soil of all its organizable materials. In consequence of this few plants will thrive, or even grow very near it; and hence the impropriety of the common practice of planting the ash in hedgerows; the extent of its roots may always be distinctly traced by the languor and

paleness of the crops that stand near it. Many varieties, or supposed varieties of it, are known to cultivators, and many more might easily be collected if it were worth the while; for it sports very much in a wild state. The most striking of the reputed varieties are the following:—

1. The *weeping;* with all the characters of the common wild tree, except that the branches grow downwards instead of upwards, so that if grafted upon a lofty stem the head will soon reach the ground and form a natural arbour. This is said to have originated accidentally in a field at Gamlingay, in Cambridgeshire.

2. The *entire leaved;* with all its leaves simple, broad, ovate, coarsely serrated, and puckered. Nothing can well be more unlike the common ash than this, which nevertheless appears upon good authority to be merely a seedling variety. Out of leaf it is hardly distinguishable by its branches from its prototype.

3. The *curled leaved;* with very short stunted branches, and deep green crumpled leaves. If this is, as it is said to be, a mere monstrous variety of *Fr. excelsior*, it is one of the most remarkable with which we are acquainted. It has a particularly dark aspect; its leaves are so thick, and its shoots so short, that it forms a blackish round-headed tree of the smallest dimensions. Its origin is unknown; it, as well as the Ornus, is sometimes called *Fr. Theophrasti.*

4. The *warted.* In this the stems are covered over with a great number of little grayish-brown tubercles; otherwise the plant has the appearance of the common ash.

Besides this, the only European ash that deserves notice is the *Fr. parvifolia*, or small-leaved ash. Its foliage is much finer and narrower than in *Fr. excelsior;* the leaflets are narrow and finely serrated, the bark is rugged, the growth slow, and instead of the toughness so characteristic of the latter species, the branches are so brittle as to be liable to constant injury from high winds. It is however a very beautiful tree, and for ornamental purposes where size is no object, it should be planted, especially as a single tree. We have now within sight of the window at which we are writing a fine old tree about thirty feet high, which, notwithstanding the damage it occasionally receives from heavy gales, is quite a beautiful object. It is possible that *Fr. rostrata* may be a variety of it: but nothing can be more erroneous than the idea that it is itself a variety of *Fr. excelsior.* It is found only in the southern parts of Europe.

In the Levant occurs the *Lentisk Ash*, Fr. lentiscifolia, a most graceful species, with long narrow leaves, composed of five or six pairs of small, distinct, sharply serrated, shining leaflets. It inhabits the country about Aleppo, and is hardy in this country, where it forms a tree of the most elegant appearance, intermediate, as it were, in appearance between a willow and an ash. The branches are deep rich purple. It is often called *Fr. Chinensis* in the nurseries. The wood-cut No. 1054 in Mr. Loudon's 'Arboreticæ Britannicum' does not in the least resemble this species.

With regard to the species of American ash, we have, in the first place, to remark that they are not well adapted to this climate, being in general too ill prepared by our short cold summers to bear our winters, and moreover injured by spring frosts: circumstances much to be regretted, because some of the species prove very handsome trees. In the second place, the number of species has no doubt been greatly exaggerated by writers upon garden botany; we cannot however at all agree with a modern writer upon these subjects, who believes all the American ashes to be one and the same species. The following are, we think, undoubtedly distinct.

Fr. pubescens, the black American ash, with three or four pairs of leaflets, which are nearly entire, flat, downy beneath, as well as the branches. A swamp tree in the middle States of the American Union.

Fr. Americana, the white American ash, with seldom more than three pairs of leaflets, which are smooth, flat, nearly entire, and glaucous on the under side, the branches smooth. A large tree in Canada and the northern States of America.

Fr. sambucifolia, the water-ash, with three or four pairs of leaflets, which are rugose, constantly serrated, hairy at the axils of the leaves underneath; when bruised smelling a little like elder; buds deep blue. A common tree in forests in the northern parts of North America.

Fr. quadrangulata, with the shoots distinctly and sharply quadrangular. A tree from Ohio, among the most unsuitable of the American ashes for this climate.

Fr. epiptera, with the keys very broad and wedge-shaped at the upper end, and taper at the base. A small tree, found all through the American Union.

All the foregoing can be procured in the English nurseries, and they perhaps form the only distinct species of the genus, which however most especially demands the attention of some judicious American botanist. A great many supposed species were distinguished by the late Mr. Bosc, whose names are current in collections; but they can scarcely be determined with precision, and are perhaps not worth the attempt.

2. Ornus, or *Flowering Ashes.*

The *Ornus Europæa*, or common Manna Ash, is a small round-headed tree, with leaves resembling those of the common ash, only the leaflets are elliptical, abruptly acuminated, and have a considerable collection of hairs at the base of the midrib underneath. In the summer, when the leaves are full grown, the trees become ornamented with a profusion of white delicate blossoms, which give them a strikingly beautiful appearance. The species inhabits the southern parts of Europe, especially the woods of Calabria and Apulia, and in those countries flowers in April.

Ornus rotundifolia is universally distinguished as a second species of this genus; differing in its leaves being much longer, the leaflets roundish, ovate, acute, not cuspidate, coarsely serrated, entire, and rather cuneate at the base, and not at all hairy underneath. In flowers it is much the same. It is a native of Calabria and elsewhere in the south of Europe.

These two plants are interesting as producing the sweet laxative substance known in the apothecaries' shops under the name of manna. It is a secretion from the leaves and branches; and, according to Fée, is caused either by artificial wounds, or by the puncture of an insect. Both species yield the substance, but, according to Tenore, that from *Ornus rotundifolia* is of better quality than the other. Fée thinks that it is also yielded by both *Fraxinus excelsior* and *parvifolia*, and this corresponds with the assertion of Dr. Fothergill, who saw the substance collected.

'In Calabria and Sicily,' says this physician, 'in the hottest part of the summer months, the manna oozes out of the leaves, and from the bark of the trunk and larger branches of the Fraxinus, or Calabrian Ash. The Ornus likewise affords it, but from the trunks and larger branches only, and that chiefly from artificial apertures; whereas it flows from the Fraxinus through every little cranny, and bursts through the large pores spontaneously. The different qualities of the manna are from different parts of the tree.'

Besides these, some other species of Ornus exist in the north of India and China, but they are too little known to require notice here.

See an elaborate account of these genera in Loudon's *Arboretum et Fruticetum Britannicum*, p. 1213.

FREDERICK I., Emperor of Germany, surnamed Barbarossa, was born in 1121, and succeeded his uncle Conrad III. on the imperial throne in 1152. Though Conrad was not deficient, either in warlike spirit or in talents, an unhappy concurrence of circumstances had prevented him from regulating, as might have been wished, all the domestic and foreign concerns of the empire. So many important affairs, both in church and state, demanded immediate attention, so many difficulties were to be overcome, that it required a man of no common energy to accomplish such a task; and of this Conrad himself was so sensible, that he did not recommend to the princes of the empire his young son Frederick, but his nephew Frederick, son of Frederick duke of Suabia, by Judith daughter of Henry duke of Bavaria, who had already given proofs of his personal courage. Accordingly on the 17th day after the death of Conrad, Frederick was unanimously chosen his successor by the temporal and ecclesiastical princes assembled at Frankfort, and crowned at Aix-la-Chapelle five days after. In the second year of his reign, Frederick settled the dispute between Canute and Sueno, competitors for the Danish crown, in favour of the latter, whom he however compelled to do him homage as his vassal. But his chief attention was directed to Italy. Complaints were made by the Apulians against Roger king of Sicily; and some citizens of Lodi also came, and represented in strong colours the tyrannical conduct of the Milanese. Frederick sent an envoy with a letter, enjoining the Milanese to refrain from such proceedings, but they tore

his letter to pieces, and his envoy saved his life by timely flight. This and other important considerations called him to Italy in 1155, where he held an assembly in the plain of Roncaglia, to receive the homage of most of the great Italian lords and principal cities. In this, his first expedition into Italy, he, in some measure, humbled the Milanese, but not choosing to attack their city took the road to Turin, received on the way the submission of many cities, and in particular inflicted severe chastisement on Asti. Having taken Tortona, after a two months' siege, he allowed the inhabitants to retire, but gave the place up to plunder, after which it was entirely burnt and destroyed. After being crowned king of Italy at Pavia, he advanced rapidly towards Rome, where Adrian IV. had just succeeded pope Anastasius. The city having been excited by Arnold of Brescia to dispute the authority of the pope, Adrian, who was a man of great resolution, excommunicated Arnold and his partizans, who were in consequence expelled by the Roman senate, and Arnold being subsequently taken prisoner, was by the emperor delivered up to the pope, who caused him to be burnt alive. Having had an interview with the pope, at which he consented to hold his holiness's stirrup, and having re-established his authority at Rome, and received the imperial crown from his hands, Frederick set out on his return to Germany. His first care was to restore the peace of the empire, which was disturbed by a dispute between the archbishop of Mentz and the count Palatine of the Rhine; he likewise ended, to the satisfaction of all parties, a most important question respecting the duchy of Bavaria. He had resolved to divorce his consort Adelaide, because she had no children; but this not being a sufficient ground for a divorce, the plea of consanguinity was set up, and a sentence of divorce was pronounced by Cardinal Joseph Orsini and several prelates. Frederick then proposed to marry a Greek princess, but this negotiation failing, he married in 1156 Beatrice, heiress of Burgundy, by which alliance he annexed that rich kingdom to his dominions. Frederick soon afterwards compelled Boleslaus duke of Poland to acknowledge himself a vassal of the empire, and in the first six years of his reign restored the empire to the same power and extent of dominion which it had under Henry III.

The affairs of Germany being settled, Frederick found it necessary again to go to Italy, where the Milanese cruelly oppressed the towns which would not submit to their orders. In 1158, Frederick with an army of 100,000 infantry and 15,000 cavalry laid siege to Milan, and the inhabitants, notwithstanding some previous successes, were reduced, after an obstinate resistance, to offer submission, which was accepted. But they again rebelled, and Frederick resolved to make an example of this haughty city, which was closely invested and compelled to surrender at discretion. Frederick's decision was that 'Milan should be a desert; that all the inhabitants should leave the city in a week, and settle in four villages, ten miles distant from each other.' It has been often asserted that the city was razed to the ground, with the exception of the churches: but this seems to be an exaggeration. The city was not plundered; the order or permission for the work of destruction extended only to the fortifications, and even of these a considerable part was left standing. But the power of Milan was broken. Its fall entirely discouraged the other cities. Brescia and Piacenza were obliged to demolish their walls; and the other cities which had joined in the insurrection were deprived of their rights and privileges.

While Frederick was thus engaged, pope Adrian, with whom he was latterly on very bad terms, died, on which a schism arose; some of the cardinals choosing Victor IV., who was inclined to the imperial interests, and the others Alexander III. Frederick, who considered himself as protector of the church, called a council at Pavia. Alexander, not recognizing this council, which consisted of fifty or sixty German and Italian bishops, it proclaimed Victor IV. as the true pope, who was acknowledged by the emperor. Alexander excommunicated the emperor and all his partizans; but though he was recognized by the kings of France and England, and the estates of Lombardy, Frederick's superiority obliged him to seek refuge in France. When the emperor returned to Germany he found that dissensions had broken out between several of the princes, which he however succeeded in appeasing; and then set out to meet Louis the Young, king of France, at Launes, near Dijon, where they had agreed that a council should be held to terminate the schism in the church, by deciding between the two popes, who were to appear, accompanied by the two sovereigns, their protectors. This plan however failed. The death of pope Victor IV. in 1164 seemed to offer a favourable opportunity for reconciliation between Frederick and Alexander III., which the former was inclined to embrace, but before his orders reached Rome his ambassador there had concerted with the cardinals to proceed to the election, and the choice fell on Guido bishop of Crema, who took the name of Paschal III., and was acknowledged by the emperor. Frederick crossing the Alps in 1165 marched direct to Rome, where Paschal was solemnly installed, and then crowned the emperor and his consort Beatrice. The power of the emperor now seemed to be greater than ever, and he hoped entirely to reduce the cities of Lombardy, which had formed a powerful league, being roused by the cruelty and boundless extortion of his officers, even in those places where his authority was still acknowledged. Frederick's plans were however defeated by a pestilential disorder, which carried off the greater part of his army, and it was with no little difficulty that he returned in 1168, from his third Italian campaign, as a fugitive. He remained six years in Germany to settle the very complicated affairs of that country, where the ambition of the several princes led to continual disputes and feuds, the most important of which was the conflict between Henry surnamed the Lion, and many princes, bishops, and counts, who formed a confederacy against him. He however defeated them, and soon afterwards married Matilda, daughter of Henry II. king of England. In 1169 Frederick prevailed on the princes of the empire to choose his son Henry, who was only five years old, king of the Romans, and he was accordingly crowned at Aix-la-Chapelle. Having appeased the disorders in Saxony, and undertaken a successful expedition against Boleslaus duke of Poland, he prepared for the fourth time to cross the Alps. The negotiations in Italy had not led to any favourable results. Soon after Frederick's return to Germany, pope Paschal died, and the cardinals in the interests of the emperor chose for his successor Calixtus III., a man very inferior in talent to Alexander. But the latter had so consolidated his power, that Frederick thought he should gain more by opposing an anti-pope to him than by attempting a reconciliation. The cities of Lombardy, encouraged by Alexander, extended their confederacy, and built a new city, which they called Alexandria in honour of him. Only Genoa and Pisa remained true to the emperor, who, to prevent matters from going too far, sent Christian, archbishop of Mentz, with a small army to Italy. The archbishop was equally distinguished as a prelate, a statesman, and a general; but he was not able to effect much towards the establishment of peace. The emperor himself having passed Mount Cenis, laid siege to Alexandria, and the united Lombard army came to its relief. Negotiations were however opened, and a truce concluded. The emperor was so sure of the result, that he sent part of the army back to Germany, which he soon had reason to repent. The Lombards grew bolder, and Henry the Lion, notwithstanding all the entreaties of the emperor, refused to proceed. A battle soon took place near Legnano, in which the emperor was defeated by the Lombards with great loss, and he himself being overpowered and supposed to be killed, his troops fled. A few days afterwards however, to the unspeakable joy of the army, he appeared again at Pavia, where the empress had already put on mourning.

This loss induced Frederick to think of peace. He treated first with Alexander, whom he acknowledged as pope, and who relieved him from the ban of excommunication. He then, by the mediation of Alexander, concluded a treaty, or rather a truce, for six years, with the cities of Lombardy, on very advantageous terms, for he in fact lost nothing essential, except that he gave up the cause of Calixtus, who obtained a rich abbey. On his return from Italy, where he passed the winter, he went to Burgundy, called a diet at Arles, and had himself and his consort crowned king and queen of Burgundy; whence he returned to Germany, much sooner and more powerful than his enemies expected. The peace of the empire being established, the princes and bishops who had sided with Alexander became reconciled to the emperor; but new troubles arose in Saxony. Henry the Lion formed great plans to extend his power, but was in the end forced to sue for peace. At Erfurt he appeared before the emperor and the German princes, to whom Frederick had made a promise to decide nothing

respecting Henry without their approbation. The sentence was that he should be relieved from the ban of the empire, retain his family dominions of Brunswick and Lüneburg, but, for the preservation of peace, should go into banishment for seven years, which, at the intercession of the pope and the king of England, was reduced to three years. Henry accordingly went with his wife and children to his father-in-law the king of England.

The truce with Lombardy now approached its last year. After several occurrences in Italy, not unfavourable to Frederick, Alexander III. died in 1181, and was succeeded by Lucius III., who was much inferior to him in ability and energy. The hostile dispositions of both parties had greatly abated during the wars, and the emperor having summoned a diet of the empire at Constance, a definitive peace was concluded, honourable and satisfactory to all parties. A year after the peace of Constance, order and tranquillity everywhere prevailing, the emperor called a general diet at Mentz, one object of which was to establish his five sons. This diet presented a scene of unrivalled festivity and splendour. The Empress Beatrice, the emperor's five sons, the archbishops, bishops, princes and nobles of Italy and Germany, ambassadors from foreign sovereigns, 40,000, some say 70,000, knights from all parts of Europe, and countless multitudes of people of all classes were here assembled. Historians have recorded those brilliant days, the wonders of which have been handed down from generation to generation, and songs composed on that occasion are still sung on the banks of the Rhine. A year after this diet Frederick again went to Italy, where he was received with extraordinary honours by the cities of Lombardy, and even concluded an alliance with Milan. But new disputes arose with the papal see, through Frederick's refusal to grant to Lucius, and afterwards to his successor Urban III., the sovereignty of the territory called St. Peter's Patrimony. He however so increased his power in Italy by the marriage of his son Henry with the daughter and heiress of William king of Sicily, that the pope did not venture to proceed to extremities. In Germany Frederick had declared Lubeck and Ratisbon imperial cities, and thereby had laid the foundation of a middle estate between the princes and the emperor, by which the power of the latter was increased, and the class of citizens elevated. The separation of Bavaria from Saxony, which Henry the Lion had possessed together, added indeed to the power of the emperor, but embittered the animosity between the party of the Guelphs and Ghibelines.

Things were in this state when all Christendom was alarmed by the news of the taking of Jerusalem by the Infidels. This event led to the Third Crusade. On the exhortation of the pope, Frederick took the cross in 1188, with his son Frederick, and a number of the principal German nobles. Upon mature deliberation it was resolved that the army should go by land through Germany, Hungary, and Asia Minor. The army, consisting of 150,000 men, besides many thousand volunteers, commenced its march in the spring of 1189. Though it met with many difficulties, chiefly from the perfidy of the Greek emperor, who had secretly made a convention with Saladin and the sultan of Iconium to obstruct the passage of the Germans, Frederick penetrated into Asia, gained two victories over the Turks near Iconium, which he took, and was proceeding in his victorious career to Syria, when his eventful life was brought to a close in an attempt to swim on horseback across the river Calycadnus, where he was carried away by the current. The statement that he was drowned in the Cydnus while bathing is certainly incorrect. Frederick was a brave and liberal prince, equally firm in prosperity and adversity. These great qualities veiled the pride and ambition which were unquestionably in part the motives by which he was actuated. He possessed an extraordinary memory, and a greater extent of knowledge of different kinds than was common in that age. He esteemed learned men, especially historians, and wrote in Latin memoirs of some part of his own life, which he left to Otho, bishop of Freysingen, whom he appointed his historian. He was of noble and majestic appearance, and, notwithstanding his disputes with the popes, a friend to religion. After his death his son Frederick, duke of Suabia, took the chief command, but died of a pestilential disorder at the siege of Acre in 1191; and of the mighty army that Frederick led from Germany only a small remnant returned.

FREDERICK II., Emperor of Germany. On the death of Frederick I. he was succeeded by his son Henry, who reigned only eight years, leaving his son Frederick, a child of four years of age, who had been created king of the Romans when in his cradle. He was very carefully educated by his mother, Constance of Sicily, and acquired a degree of learning very extraordinary at that age. His hereditary dominions consisted of the kingdoms of Naples and Sicily, the duchy of Suabia, and other territories in Germany. In 1210, the emperor Otho being excommunicated by the pope, Frederick, then fourteen years of age, was declared emperor by a considerable number of the German princes, but it was not till some years afterwards, on the retreat and death of Otho, that he became peaceable possessor of the imperial throne, and was crowned at Aix-la-Chapelle in 1215. No prince in the middle ages, Charlemagne perhaps excepted, has made so distinguished a figure; the most remarkable period of those ages is connected with his name and his long reign. It was the time in which Innocent III., Gregory IX., and Innocent IV. carried Gregory VII.'s policy to an extent that had been considered as impossible; when the origin of the orders of knighthood, the foundation of the Mendicant orders, and the Inquisition became formidable pillars and supporters of the spiritual edifice; when, the nations of Europe were for the first time impressed by the Crusades with one general idea, represented by the symbol of the cross, and drawn closer together; when, after many single voices had died away unheeded or forgotten, a Protestantism of the middle ages was proclaimed by the Waldenses and the Albigenses; when chivalry attained a more elevated position, ennobled by religion and a regular organization; when the class of free citizens gradually rose in estimation and importance, and favoured in Germany by Frederick against the aristocracy, and opposed by him in Upper Italy as instruments of the popes, acquired, by means of great confederations of many cities, and, by the institution of corporate bodies, respect abroad and internal strength; when, in opposition to the club-law, a law for ensuring public peace and security was first proclaimed in the German language; when the Secret Tribunal began to act in its first, scarcely perceptible commencement; when the first universities excited a spirit of inquiry and research; and when the poetry of the Troubadours found a home in Germany and Italy, and was honoured and cultivated by emperors and kings.

Frederick, though not tall, was well made; he had a fine open forehead, and a mild and pleasing expression of the eye and mouth. The heir of all the best qualities of all the members of his distinguished race, enterprizing, brave, liberal, with excellent natural talents, full of knowledge; he understood all the languages of his subjects, Greek, Latin, Italian, German, French, and Arabic; he was austere, passionate, mild, and generous, as the occasion prompted, cheerful, magnificent, and fond of pleasure. And as his body had gained strength and elasticity by skill in all chivalrous exercises, so his mind and character, early formed in the school of adversity and trial, had acquired a degree of flexibility which those who are born to power but seldom know, and an energy which strengthened and raised him in times of difficulty. But such a body and such a mind were necessary for a man who was to combat in Germany, already divided into parties, a preponderating aristocracy; in Upper Italy a powerful democracy; in Central Italy an arrogant hierarchy; and in his own southern hereditary dominions, to reconcile, and unite by internal ties, the hostile elements of six nations; who, opposed by temporal and spiritual arms, by rival kings, by excommunication and interdict, persevered, conquering and conquered, for forty years, survived the rebellion of a son, the treachery and poison of his most valued friend, the loss of his favourite child, and did not resign the sceptre, which he had held so firmly, till the last moment of his life.

Till the year 1209, when Frederick took upon himself the government of Lower Italy and Sicily, he was under the guardianship of Innocent III.; but the empress Constance, his mother, was obliged to purchase the investiture of Naples and Sicily, and the coronation of her son, by sacrificing to the pope the most important ecclesiastical rights. The royal crown of Germany, which was adjudged by the German princes to the child when only three years of age, was taken, after the death of his father, by the duke of Suabia, his uncle, who however wore it without advantage in opposition to Otho IV. till he was murdered in 1208 by Otho

von Wittelsbach; but Otho IV. displeasing the pope, Innocent himself called Frederick to the throne of Germany. In spite of all the efforts of the party of the Guelphs, Frederick arrived in Germany in 1212, and was received with open arms by the party of the House of Hohenstaufen. The possession of the crowns of Germany and Sicily inspired Frederick with hopes of making himself master of all Italy, subduing Lombardy, and reducing the power of the spiritual monarch to the dignity of the first bishop of Christendom. But he misunderstood the spirit of his age, which was far less enlightened than himself, and still cherished prejudices which he had overcome. If the conception of the plan was great, it was equalled by his prudence in gradually preparing to carry it into effect. In 1220 he caused his eldest son Henry to be chosen king of the Romans, and appeased the anger of the new pope Honorius III. by alleging that this measure was absolutely necessary before he could proceed to the crusade which he had undertaken, and by promising that he never would unite Sicily with the empire. Disregarding the refusal of the Milanese to place the iron crown on his head, he proceeded to Rome, was crowned emperor in 1220, and as such hastened to his hereditary dominions which he had left almost as a fugitive. It was there that preparations were to be made for the crusade, but first of all it was necessary to put an end to the internal troubles of the country. By the advice of Hermann von Salza, grand master of the Teutonic order, Frederick married Iolante, daughter of John of Brienne, titular king of Jerusalem, and assumed his father-in-law's title. Meantime the pope granted him a delay for undertaking the crusade; his chancellor, Peter de Vinci, compiled a new code of laws, the object of which was to settle the authority of church and state, to reconcile the nobility, clergy, citizens, and peasants, and to be adapted to many different nations, Romans, Greeks, Germans, Arabs, Normans, Jews, and French, respecting as much as possible all existing institutions. For the education of his subjects, he founded a university at Naples in 1224; and the medical school at Salerno was very flourishing. The belles lettres were cultivated at his court, and Frederick himself, some of whose juvenile poems in the Sicilian dialect, at that time the most cultivated, have been preserved to our times, may be considered as one of the first authors of the refined Tuscan poetry. Many eminent artists, Nicola, Masaccio, and Tomasi da Steffani, were patronised by Frederick; and the collections of works of art at Capua and Naples were founded.

The year 1227 being fixed for the crusade, Frederick proposed before he set out to call a general diet of the empire at Cremona, to satisfy himself of the sentiments of the Lombards and be crowned as their king. But the Milanese refused, renewed their antient league with fifteen cities, and intercepted the communication with Germany by occupying the passes of the Alps. For this they were put under the ban of the empire; but Frederick hastening to the crusade, left the management of the affair to the pope, who only proposed a general amnesty, and enjoined the Lombards to furnish 400 horsemen at their expense, for two years, to join the crusade. At this juncture Honorius died, and Cardinal Hugolinus, nephew of Innocent III., was chosen pope by the name of Gregory IX. He was then eighty years of age, and, as the emperor certifies, 'of unblemished character, equally distinguished by piety, learning, and eloquence,' and resembling, in the energy of his will, Gregory VII.: he urged the emperor, who received the cross for the second time from his hands, to fulfil his promise, and did not hesitate to censure the luxurious way of life of the emperor and his court. A great number of pilgrims had assembled in Italy, but pestilential diseases raged among them, and the emperor himself was ill when he embarked with Louis, landgrave of Thuringia. In three days Frederick grew worse, and was obliged to land at Otranto, where Louis Landgrave died. The fleet proceeded only to the coast of the Morea, and the crusade failed. Upon this Gregory excommunicated the emperor, and laid his dominions under an interdict. Frederick however, notwithstanding the death of his wife Iolante in child-bed, set out on a new crusade in 1228; but Gregory, who had not expected this, and thought it improper for a prince under excommunication to go to the Holy War, commanded the patriarch of Jerusalem and the three orders of knights to oppose the emperor in everything, and caused Frederick's hereditary estates to be occupied and laid waste by his soldiers and John of Brienne. Frederick, notwithstanding all this, by an agreement with Kamel, sultan of Egypt, succeeded in making a ten years' truce, and acquired for himself Jerusalem, the holy places, all the country between Joppa, Bethlehem, Nazareth, and Acre, and the important seaports of Tyre and Sidon.

The city of Jerusalem, where Frederick, on the 18th May, put the crown upon his own head because no priest would even read mass, was laid under an interdict, and Frederick was even betrayed to the sultan, who gave him the first information of it. Frederick hastened back to Lower Italy, and after fruitless negotiations with Gregory re-conquered his hereditary estates and defeated all the intrigues of the pope, who was at length obliged (1230) to free him from the excommunication. The Lombards alone would not hear of any terms, prevented his son Henry from going to the diet at Ravenna, and were not deceived by Gregory's exhortation to peace. While Frederick at last reconciled the pope with the Romans, the latter secretly endeavoured to induce King Henry to rebel against his father, promising that he would be received by the Lombards with open arms. Henry's party in Germany too was already considerable; but Frederick suddenly appeared, and Henry, quite abashed, fell at his feet and entreated forgiveness. When however the infatuated young man made a second attempt, he was sent with his wife and child to imprisonment for life at San Felice, in Apulia; then to Neocastro, in Calabria; and lastly, to Martorano, where he died unreconciled, in the seventh year of his imprisonment. On this event the emperor wrote to the states of Sicily, 'I confess that the pride of the living king could not bend me, but the death of the son deeply affects me; and I am not the first nor the last who suffered injury from disobedient sons, and yet wept over their graves.' It is indeed a striking contrast, that almost at the same time, when Frederick sent the son of his first wife to prison, and caused him to be formally deposed at the diet at Mentz (1235), he celebrated with much pomp his third marriage with Isabella of England. In 1236 he made preparations at Augsburg for an expedition against the Lombards, in which the friendship of Ezelino, sovereign of Verona, and that of the Ghibelline cities of Upper Italy, was to double the strength of his little army; but a contest, which was soon ended, against Frederick, duke of Austria, the last of the house of Babenburg, interrupted in 1237 the war which was already commenced, and the election of Conrad, his second son, as king of the Romans. After the recommencement of the war against the cities of Upper Italy devoted to the party of the Guelphs, the victory of Corte Nuova, on the Oglio, on the 26th and 27th November, 1237, broke the power of the Lombards; all the cities, except Milan, Bologna, Piacenza, and Brescia, submitted; but Gregory became more enraged, especially when the emperor made his natural son, Enzio, king of Sardinia, and prepared to subdue the rest of Lombardy. On Palm-Sunday, 1239, Gregory again excommunicated Frederick, who continued the war, but sustained much injury by the secret perfidy of Ezelino, of which he had no suspicion. To put a complete end to the war, he suddenly, in 1240, turned his arms against the pope himself, penetrated through Spoleto into the states of the Church, and made the pope tremble in his capital. Rome would have proved an easy prey if he could have subdued the last remnant of superstition in his breast; but here, and in his edicts against heretics, we see the ties which still bound Frederick in the fetters of his times. Nor did he know the spirit of Gregory, when he thought he could compel him to make peace. He wished rather, without proceeding to the last extremities, to have his cause decided in an assembly of bishops; but finding that only his most determined enemies were invited to it, he warned all prelates against going to Rome; and at last, when all his admonitions availed nothing, he caused the Genoese fleet to be attacked and destroyed by his son Enzio, and above 100 prelates who were on board, on their way to Rome, to be taken to Naples as prisoners. This blow at length laid the invincible Gregory on his death-bed on the 21st August, 1241; but by his death, deprived the emperor of almost certain victory.

While he was engaged in these enterprises, Frederick had not been able to contend in person with the Mongols, who had penetrated into Germany, but after their victory at Wahlstadt in 1241, and their defeat at Olmutz, turned back. After the short reign of Pope Celestine IV. and a long interregnum, Frederick at length obtained the

election of a pope; but Sinibald Fiesco, who, when cardinal, had been his friend, became, as Innocent IV., the most formidable of his enemies. He continued Gregory's excommunication, and dreading the vicinity of the emperor in Italy, fled in 1244 to Lyon. Frederick had now the alternative, either to appear as a criminal before the judgment-seat of a priest, or to commence the unequal conflict with the superstition of the age. The pope renewed the excommunication and summoned a general council to Lyon. Thaddeus of Suessa, the emperor's chancellor, defended his cause before this council with overpowering eloquence and truth, and refuted the most malicious, as well as the most absurd accusations. Frederick, accused of heresy, in vain suffered himself to be examined respecting his faith; however religious and pure he appeared, he was guilty, because it was resolved he should be so, and the pope pronounced against him the most dreadful anathema—released all his subjects from their oath, declared him to be deprived of all honours and dignities, as a perjurer, peace-breaker, robber of churches, a profaner of sanctuaries, and heretic; and he also declared that those who remained faithful to the emperor should be included in the same sentence. But Frederick showed that he was still emperor: he justified himself, as became a great sovereign, before the princes of Europe; and while Innocent was labouring for the election of the landgrave Henry Raspe of Thuringia, to the imperial throne, he fought successfully against the Lombards, defeated a conspiracy at his court, and did not lose his courage even when his son Conrad was defeated by his rival Henry. Conrad in the sequel obtained the victory, and Henry died in 1247. But what most deeply wounded him was the conduct of Peter de Vinears, who had long wavered in his fidelity, and when he found himself discovered, attempted to poison Frederick. This plan being defeated he was cast into prison, where, in despair, he dashed his head against the wall and was killed. It is to be observed, that Raumer, in his 'History of the House of Hohenstaufen,' considers this story of the attempt to poison the emperor very doubtful, though he does not believe that Peter was entirely innocent. The emperor, who had become mistrustful of his friends, lost Parma by an insurrection, and being defeated in a camp which he had formed before it, he lost his army, his treasures, and his friend Thaddeus of Suessa. William of Holland, though only twenty years of age, was at the instigation of Innocent elected emperor by the three Rhenish archbishops; Enzio, his son, was made prisoner by the enraged Bolognese, and Ezelin joined his enemies. His own health now declined, and he desired to die in peace; but Innocent rejected the most reasonable terms of reconciliation. Frederick's spirit was again roused: he was victorious in Lombardy, and would perhaps have humbled Innocent himself had he not been surprised by death at Fiorentino, in the arms of his natural son Manfred, on the 13th of December, 1250, in the fifty-sixth year of his age, and the forty-first of his reign.

FREDERICK III., emperor of Germany, son of Ernest, duke of Austria, was born at Inspruck, on the 21st September, 1415. He was not yet of age, when, according to the fashion of those days, he went on an expedition to the Holy Land. In 1435, in conjunction with his brother Albert the Prodigal, he assumed the government of his dominions, the revenues of which did not much exceed 16,000 marks. Being elevated to the throne of Germany, in 1440, on the death of his cousin Albert II., he appeared destined to take a decisive part in the great affairs of his age; but he was averse to every thing that took him out of his own narrow sphere, and was especially deficient in attachment to the interests of Germany. It is true there were many circumstances in the state of Germany, and in his own situation, which partly excuse him. At the very commencement of his reign he was engaged in war with his brother Albert, who reigned in Upper Austria, and was in danger of losing all his hereditary dominions. In different parts of Germany troubles arose, which required a more vigorous hand than his to put them down. He called several diets, chiefly to put an end to the schism in the church, which was not effected till 1447, when Felix was persuaded to abdicate, and Nicholas V. was acknowledged as lawful pope. In 1452 Frederick went to Italy, where he received the imperial crown from the pope, as well as the crown of Lombardy, along with his betrothed consort Eleanora, sister of the king of Portugal. But he did not thereby acquire a greater degree of moral energy, or an increase of political independence; nor did he recover any of the rights of the Empire which had been torn from it by various usurpers. In 1453 he revived the archducal title in his family, and busied himself with his botanical pursuits, while the danger on the side of Turkey became more threatening. He did not make any attempt against Milan, where, after the extinction of the male line of the Visconti, the usurper Sforza had established himself. How unfortunate and unstable he was in his external policy appears from his transactions with Hungary and Bohemia, and the manner in which, with a view to recover some crown lands of which the house of Austria had been deprived, he interfered in the internal disputes of the Swiss Cantons; but not having a sufficient force of his own, and not being supported by the Empire, he called in foreign troops from France under the Dauphin, which, having been taught a lesson by Swiss valour at St. Birs Jacob, in 1444, turned their arms in part against Germany and Austria itself. In Germany he was threatened with still greater danger. In 1449 he was entangled in a quarrel, on account of the succession to the Palatinate, with Frederick, the victorious brother to the deceased Louis, who demanded the Electorate for himself instead of his nephew Philip, and being opposed by Frederick, brought over Mentz, Treves, and a number of German princes to his side, and even held out to the Bohemian George Podiebrad a prospect of obtaining the imperial crown. When his ward Ladislaus died, without children, in 1457, Lower Austria came to Frederick, Upper Austria to Albert, and part of Carinthia to Siegmund of Tyrol; but Vienna remained to all of them in common. On this death, notwithstanding Frederick's pretensions to Bohemia and Hungary, he had the mortification to see George Podiebrad preferred to him in the former, and Matthias Corvinus in the latter. Scarcely had he recovered from this cause of vexation, when, in 1462, his brother Albert raised an insurrection against him in his capital Vienna, and Frederick, being besieged there, was delivered by his opponent Podiebrad. In this distress he at length, for once, manifested resolution, and declared that the palace should be his grave before he would yield to rebellious subjects. For many years he was engaged in contentions respecting the duchy of Austria, of the whole of which he obtained possession by the death of Albert in 1463. In 1468 he again went to Rome, and had several conferences with Pope Paul II., as to the means of opposing the progress of the Turks: nothing, however, was done, and he suffered them to penetrate in 1469 to Carniola, and in 1475 nearly to Salzburg, almost without opposition. His wavering policy caused the kings of Bohemia and Hungary to quarrel; but afterwards both turned their arms against him, and Matthias Corvinus, king of Hungary, laid siege to Vienna in 1479, and was only prevailed on to retire by Frederick's renouncing all his own pretensions to Hungary, and granting him the investiture of Bohemia, with a sum of money. It is probable that he was rendered more indifferent to the fate of his hereditary dominions by the success of his plan for the aggrandizement of his family, by the marriage of his son Maximilian with Maria of Burgundy, the rich heiress of Charles the Bald, which did not take place till 1477, after the death of Charles. In 1485 he had a new quarrel with Matthias, who took from him Vienna and all Lower Austria. Frederick withdrew to his son Maximilian in the Netherlands. In 1486 Maximilian was chosen king of the Romans, but soon afterwards was entangled in a war with France, and even with the Netherlands, on account of the guardianship of his children. In 1488 Maximilian was taken prisoner, and Frederick resolved to hasten to his assistance. On the death of Matthias in 1490, Frederick recovered Austria, but was obliged to leave the Hungarian crown to Ladislaus of Bohemia. At length, after so many defeated plans, he died on the 19th August, 1493, as some report, from a disorder contracted by a surfeit of melons; according to others, in consequence of an amputation of the leg; leaving it to his son to realise the device inscribed upon his books and his palaces, A, E, I, O, U, by which he is generally supposed to have meant *Austria est Imperare Orbi Universo*. When it is considered that Frederick died in the 78th year of his age, after a reign of fifty-eight years in Austria, and fifty-three as Emperor of Germany, it is surprising how small a share he had in the important events of that long period, which is rendered memorable by the taking of Constantinople by the Turks—

by the revival of learning, in consequence of the influx of fugitives from Greece, and the increased number of universities in Germany and Italy,—by the invention of printing, by the visible advance of the states of Western Europe towards one political system,—by the end of the duchy of Burgundy, which gave occasion for 200 years' wars, and by the weakening of the Papal power by the treaties of Constance and Basle. The character of Frederick, as his whole reign evinces, entitled him to his surname of "the Pacific:" he was cautious, scrupulous about trifles, avaricious, but temperate, plain in his apparel, chaste and devout, and remarkably fond of astrology, alchemy, and botany—possessed, in short, of qualities which might have made him a respectable private gentleman, but wholly unequal to the task of governing an empire, especially in the state in which Germany, divided among 1500 masters, was in his age.

FREDERICK WILLIAM, elector of Brandenburg, surnamed the Great Elector, was the son of the elector George William. In the distracted state of Germany during the Thirty Years' War, and the necessary absence of his father with the army, the young prince saw but little of the splendour and indulgences of a court, and passed the first years of his life in retirement with his tutors, who were men of learning and experience, and with his mother, first at the castle of Litzlingen, in the forests of the Altmark, and afterwards at Custrin. The adventures and the singular fortunes of his mother's family (who was sister of Frederick, king of Bohemia, husband of the princess Elizabeth, daughter of James I. of England), the cruel and barbarous manner in which the war was carried on, and the dangers to which he and his family were exposed, necessarily made a deep impression on his mind. In his eleventh year he paid a visit to his father's sister, Maria Eleanora, queen of Sweden, consort of Gustavus Adolphus, whose conversation naturally dwelt on the exploits of her illustrious husband, whose mortal remains he contemplated at Wolgast only two years afterwards. At the age of fifteen he was sent to the university of Leyden, where he especially devoted himself to the classics and to history. Of modern languages he was a proficient in the French, Dutch, and Polish. He was afterwards in the camp of Frederick Henry, prince of Orange, during the siege of Breda, and was much noticed by the prince for his amiable manners and exemplary conduct, as well as for his sound understanding. About this time a society of young persons of both sexes (called Media Nocte) endeavoured to draw the prince into its circle; but his friend and tutor, the baron Schulenberg, making him aware of the immoral nature of the society, the prince resolved immediately to quit the Hague. The prince of Orange was much surprised at this self-command, and when the prince arrived in the camp before Breda, said to him, 'Cousin, your flight is a greater proof of heroism than if I took Breda; he who so early knows how to command himself will always succeed in great deeds.' These words, as he himself owned, made a deep impression on him.

His father dying in 1640, the young prince found his dominions reduced to a most deplorable condition by war and bad government. The exactions of Wallenstein in the Mark alone were estimated at twenty millions of gold florins; and in a memorial of the magistrate of Prenzlau, it is stated that the inhabitants are reduced to such dreadful extremities that they not only eat dogs, cats, and even carrion, but that both in the town and country they attack and kill each other for food. He commenced his government with a degree of prudence and wisdom rarely found in so young a sovereign. His first care was to correct many crying abuses, and to restore order in the finances. His attention was then directed to foreign affairs. In 1642 he received the investiture of Prussia from the king of Poland; in 1643 he concluded a peace with the Swedes on condition of their evacuating the greater part of his dominions. At the peace of Münster he was not able to enforce his claims to Pomerania and Silesia, but obtained Magdeburg, Wallenstadt, Minden, and part of Pomerania. It is highly to his credit that it was chiefly owing to him that the principle of equal rights and privileges for the two great divisions of the Protestant church was admitted in that famous treaty. Charles Gustavus, king of Sweden, appearing emulous of rivaling Gustavus Adolphus, the elector concluded an alliance with Holland, and sought the friendship of Cromwell and Louis XIV. He was however obliged to make in 1655 a treaty with the Swedes, in consequence of which he joined in the invasion of Poland, and greatly contributed to the victory at Warsaw. Austria, Holland, and Poland vehemently protested against this alliance with Sweden, but Cromwell, who believed the Protestant cause to be in danger from the king of Poland, sent William Jepson as his ambassador to the elector, whom in letters he compliments in the highest terms for his service to the Protestant religion. But Russia and Austria declaring in favour of Poland, he, by the mediation of Austria, concluded a convention with Poland at Wehlau, by one of the stipulations of which he obtained the entire sovereignty of Prussia; and in 1678 completed the conquest of all Pomerania by the taking of Greifswald and Stralsund. The death of Charles Gustavus freed him from an adversary who would probably have endeavoured to prevent the execution of this treaty, which was confirmed by the treaty of Oliva. Frederick, now at peace with his neighbours, directed all his attention to promote the welfare of his subjects by favouring all internal improvements; the ruined towns and villages were rebuilt, new roads made, waste lands cultivated, commerce encouraged, and many useful establishments founded.

In 1672 however, Holland being threatened by Louis XIV., he concluded a treaty with the republic, engaging to furnish 20,000 men for its defence. He also contributed to induce the Emperor, Denmark, Hesse Cassel, and several German princes to join him against France. But though his advance into Westphalia induced the French to quit Holland, the campaign was rendered unsuccessful by the slowness of the Austrian general, and he was forced to abandon Westphalia to the enemy. The Austrians leaving him, and the Dutch neglecting to send him subsidies, he was obliged to make a convention with France in 1673. The French were to evacuate Westphalia and pay him 800,000 livres, he promising to withdraw from his alliance with Holland, and not to support the enemies of France; yet he reserved to himself the right of assisting the German emperor in case of attack. This happened in 1674, when he invaded Alsace with 16,000 men, and joined the Imperial army; but the Austrian general Bournonville, avoiding a battle, contrary to the advice of Frederick, Turenne receiving reinforcements, obliged the Germans to quit Alsace. In order to free themselves from Frederick, the French instigated the Swedes to invade Pomerania and the March, which they attacked in December, 1674, with 16,000 men. Frederick hastened to his dominions, and proceeding with great rapidity and secrecy at the head of only 5000 men, he totally defeated 11,000 Swedes at Fehrbellin in 1675, and freed his dominions from the enemy. Following up his successes, he took Stettin. In January, 1679, he crossed the Frische Haff and the Gulf of Courland with his army on sledges over the ice, and surprising the Swedes in their winter quarters, compelled them to quit Prussia. He did not reap any real advantage from his success, for Louis XIV. insisted that he should make peace with Sweden and give up all his conquests; and on his refusal sent an army of 30,000 men to lay waste the duchy of Cleves and city of Minden, so that he was forced to conclude the treaty of St. Germain, by which he restored all his conquests to Sweden; the French withdrew from his Westphalian dominions, and paid him 300,000 crowns. After this we do not find Frederick again in the field. He was indeed engaged in various negotiations; was involved in disputes with France on account of its unjust seizure of Strasburg and Luxemburg; and in consequence of his receiving 20,000 French protestants who left their country on the repeal of the edict of Nantes. Frederick, who had previously received from his ambassador, Von Spanheim, notice of the intended measure, had made preparations to receive the fugitives, and sent funds to his agents at Frankfort, Amsterdam, and Hamburg, for their assistance. In like manner he protected the proscribed Waldenses. Having in vain interceded for them in a very affecting letter to the duke of Savoy, he offered to receive 2000 of them into his dominions. He sent 8000 men in 1686 to assist the emperor against the Turks; having in the year preceding renewed his alliance with Holland; and when Prince William of Orange was preparing for his expedition to England, Frederick assisted him with several regiments, and Marshal Von Schomberg, who was killed at the battle of the Boyne. As another proof of Frederick's enterprising spirit, it deserves to be noticed that Spain neglecting to pay him the arrears of a subsidy promised him for his co-operation against France, he

resolved to commence a war by sea against that power: he fitted out eight frigates which had been employed against Sweden, and sent them in 1680 to capture Spanish ships, and they actually took some rich merchantmen.

We have not space, nor is it necessary to detail the proceedings of this great prince in consolidating the prosperity of his dominions and the welfare of his subjects. He died in April, 1688, leaving to his son a well-cultivated, much enlarged territory, a well-filled treasury, and an army of 30,000 excellent troops. He was twice married; first in 1647 to Louisa Henrietta, princess of Orange, a most amiable and accomplished person, author of the celebrated German hymn, 'Jesus mein Zuversicht.' She died in 1667. In the following year Frederick married Dorothea, duchess dowager of Brunswick Lüneberg; but though an excellent and virtuous princess, she was not liked by the people, chiefly because she was on ill terms with her step-children, especially the crown-prince. The character of Frederick, both in public and private life, has always been highly esteemed. He was kind, generous, fond of society, and though rather quick in his temper, extremely placable. As a sovereign, he appears to have justly merited the surname of the Great Elector. Some writers have blamed his frequent changes of party; but it must be recollected that a weak state, surrounded by powerful neighbours, cannot always choose its own line of politics.

FREDERICK I., king of Prussia after 1701, but as elector of Brandenburg, Frederick III., was born in 1657, at Königsberg, and on the death of his eldest brother became heir apparent; but being deformed, and of a very weak constitution, his education was neglected, and his step-mother even prevailed on the elector, his father, to make a will by which he bequeathed all the acquisitions of territory which he himself had made to be divided among the children of his second wife. But this disposition did not take place, and Frederick succeeded to the whole of his father's dominions in 1688. After the death of his first wife Elizabeth Henrietta, princess of Hesse Cassel, he married, in 1684, Sophia Charlotte, princess of Hanover, sister of George I., afterwards king of England. Immediately on his succession he agreed with William prince of Orange to assist him with 6000 men in his expedition to England. In 1689 he sent 20,000 men to join the imperial army against France, whose troops laid waste the Palatinate. In 1691 he joined the grand alliance between the emperor, Spain, Holland, and England, against France, and sent 15,000 men to the Netherlands, of whom King William had the chief command. He had an interview with that monarch, which did not prove very satisfactory to either party, the characters of the two sovereigns being essentially different. William, cold, simple in his manners, and solid in his views; Frederick impatient, entertaining a high opinion of his own greatness, and punctual in the observance of all points of etiquette. He also assisted the emperor with 6000 men against the Turks for a subsidy of 150,000 dollars. At the treaty of Ryswick, the conditions of the treaties of Westphalia and St. Germain, relating to Brandenburg, were confirmed. By negotiations with various powers, or by purchase, he obtained several additions to his dominions, and a prospect of others. In 1703 he took possession of the town of Elbing, which had been already mortgaged to the Great Elector for 400,000 dollars, which sum had not been repaid. The grand object of his ambition was to obtain the title of king of Prussia, that being the only part of his dominions of which he had the absolute sovereignty. He did not make known his design till the war of the Spanish Succession, when he made it a principal condition of his assisting the emperor, that he should be recognised king of Prussia, to which the emperor consented in a treaty, signed in November, 1700. For this he renounced the arrears of the subsidy due by Austria, and engaged to maintain 10,000 men at his own expense in the war of the Succession; in all the affairs of the empire to vote with Austria; at the election of an emperor, always to give his vote to an Austrian prince; and not to withdraw his German states from their obligation to the empire. On the 18th January, 1701, he put the crown on his own head, and also on that of his consort, who was not gratified with this elevation. On this occasion he founded the order of the Black Eagle. Frederick, as the ally of Austria, sent 20,000 men to the Rhine and 6000 to Italy, who distinguished themselves in the battles of Blenheim, Turin, &c. Frederick did not live to see the end of this war, as he died on the 25th of February, 1713, before the conclusion of the peace of Utrecht. Though he was chiefly actuated by personal vanity to assume the royal dignity, his illustrious descendant speaks of this step as having eventually raised the house of Brandenburg to its independence of Austria. He was more justly to be blamed for his excessive love of external pomp, for the lavish manner in which he rewarded his favourites, and for having purchased the royal dignity on such humiliating conditions. It must be added in his praise, that in compliance with the wishes of his queen, he gave great encouragement to arts and sciences. He founded the University of Halle, and the Academy of Sculpture and Painting at Berlin. He enlarged his capital by adding to it the suburb called Friederichstadt, built the palace of Charlottenburg, in honour of his second wife, and founded in 1705 the Supreme Court of Appeal. Notwithstanding his failings and weakness, he was naturally of a kind disposition, and merits much praise for having been able, in those critical times, to preserve his dominions from the horrors of war.

FREDERICK WILLIAM I., king of Prussia, son of Frederick I., was born in 1688. At a very early age he manifested a predilection for military exercises: at the age of five years he was sent to Hanover to be brought up with the electoral prince, afterwards George II. of England. The court of his grandfather, where the mode of living was strictly economical, simple, and without the restraints of rigid etiquette, pleased the young prince much more than the formal magnificence of his father's court. He served in the allied army against the French, and distinguished himself at the siege of Menin and the battle of Malplaquet. In 1706 he married the princess Sophia Dorothea of Hanover. His character being in many respects directly the reverse of that of his father, he commenced, immediately on his accession on the 25th February, 1713, to retrench the luxury that had prevailed in the preceding reign; he reduced the salaries of persons in office, limited their number, and endeavoured to introduce order into the finances. In his own person he set an example of the utmost plainness of apparel, and laid aside all the formalities of his station; while the queen and princesses were allowed to wear only dresses of the simplest kind. He devoted himself to public business, examined everything, was easy of access, and received and answered letters from the meanest of his subjects; but he was austere and arbitrary, and carried to the utmost extent his ideas of the divine right of kings. Though he repeatedly declared the republican constitution of Holland to be a model for all states, and boasted that he was himself a true republican, he was very far from allowing any check on his own power. His reforms in the finances and expenditure enabled him to gratify his most ardent wish, of keeping a great military establishment, and he laid the foundation of that strict discipline and regularity by which the Prussian troops have been since so greatly distinguished. His childish passion for tall soldiers is well known. No expense was spared in order to gratify it; men of gigantic stature were picked up in all the neighbouring states, and many were even kidnapped or forced into his service, by which he involved himself in many serious quarrels. This economy of his internal administration enabled him to repeople those provinces which were desolated by the plague, by means of colonies from other states, which he settled on very advantageous terms. He was liberal in rewarding the industry and ability of those who introduced any new art, and many of the richest manufactories in the Prussian dominions owe their foundation to him. But he had a mortal aversion to all abstract sciences, and even to poetry and literature; and he expelled the celebrated philosopher Wolf for his metaphysical opinions. He erected many public buildings at a considerable expense, but built little, and with great economy, for himself and his court. He founded the Medico-Chirurgical College, the Charité, and the Foundling Hospital at Berlin, the Berlin Cadet-Establishment, and the Orphan House at Potsdam; the emigrants from Salzburg and the Polish dissidents met with a favourable reception in his dominions. On the other hand the Berlin academy and the universities narrowly escaped dissolution. The details of his private life have been given at great length by his daughter, the Margravine of Baireuth; and his character is portrayed in a few happy touches by Voltaire (*Mémoires, &c. écrits par lui-même*). The public events of his reign were of no great importance. In the treaty of Utrecht, France and Spain recognised his

royal title, and the sovereignty of Neufchâtel and Valengin was given him. In the course of the war in the north, in which his father had taken no part, the Russians and Saxons, after the capitulation of the Swedish general, Steenbock, in Tönningen, resolved to occupy Swedish Pomerania. The king wished to restore tranquillity in the north by his mediation; but Charles XII., who had returned from Turkey to Stralsund, rejected his proposals, and required Prussia to give back Stettin, but refused to repay the 400,000 dollars which Frederick had advanced to indemnify the Russians and Saxons for the expenses of the war. This induced Frederick William in 1715 to declare war against Sweden, and to make an alliance with Russia, Saxony, and Denmark. In this war the island of Rügen and Stralsund were taken, but no other event of importance occurred, and after the death of Charles XII. peace was restored; Prussia retaining Hither Pomerania, Stettin, and the islands of Usedom and Wollin, and paying to Sweden 2,000,000 of dollars. Count Seckendorf, the Austrian ambassador, induced the king to withdraw from the alliance which had been concluded at Hanover, between England, Holland, and Prussia, after George II. had ascended the throne of England, and to agree in the treaty of Wusterhausen, in October, 1726, to recognise the Pragmatic Sanction, and, if necessary, to support it with 19,000 men. On the breaking out of the war in Poland in 1733, he caused king Stanislaus, the opponent of Augustus II., to be honourably received at Königsberg, when he fled from Poland, by which conduct he displeased the courts of Vienna and Petersburg, the allies of Saxony. However, when France declared war against Austria, he assisted the latter with a corps of 10,000 men upon the Rhine. The king and the crown prince were for some time with this corps; but nothing of importance was effected, and peace was concluded at Vienna in 1735. About this time Frederick William fell into a weak state of health, which increased the natural violence of his disposition. He was for a time supposed to be in great danger, but recovered and lived for some years, on the whole upon pretty good terms with his son, in whose arms he expired on the 31st of May, 1740. He left to his successor 9,000,000 of dollars in his treasury, a disciplined army of 70,000 men, and a kingdom of the extent of 2190 German square miles, with a population of 2,240,000 inhabitants.

FREDERIC II., king of Prussia, son of Frederic William I. and of Sophia Dorothea, princess of Hanover, was born on the 24th January, 1712. Distinguished by his contemporaries and posterity by the surname of the Great, he appears to have established by his talents and his success (which seem to be essential ingredients in the character of what the world calls a great man) as fair a claim to the title as the generality of those princes on whom it has been bestowed. He passed the first years of his youth under the restraints of a rigid education, the sole object of which was military exercises; but as he had received the rudiments of his education from a French lady, under whose care he acquired considerable knowledge of the language, and as she and his first tutor, M. Duhan, had great influence over him, he imbibed a taste for polite literature. These two persons, together with the queen, formed in secret a kind of opposition to his father's system of education. The prince was entirely attached to his mother, and there arose an estrangement between the father and the son, which suggested to the king the idea of leaving the throne to his younger son Augustus William. Impatient of the tyrannical conduct of his father, Frederic resolved to seek refuge in England with his maternal uncle George II. Only his sister Frederica, and his friends lieutenants Katt and Keith, were acquainted with the secret of his intended flight, which was to take place from Wesel, whither he had accompanied his father. But some indiscreet expressions which fell from Katt betrayed the prince's intention. The prince was overtaken, sent to Custrin, where he was kept in close confinement. Keith escaped, and lived in Holland, England, and Portugal, till after Frederic's accession, when he returned to Berlin. Katt was taken and beheaded. It appears certain that the king had resolved to take away his son's life, and that he was only saved by the intercession of the emperor of Austria, Charles VI., through his ambassador, Count Seckendorf. (Voltaire, *Mémoires*, &c.) The prince, after he had been released from his strict confinement in the castle of Custrin, was employed by his father as youngest member of the Chamber of Domains, and not permitted to return to court till the marriage of the princess Frederica to the hereditary prince Frederic of Baireuth. In 1733 his father obliged him to marry the princess Elizabeth Christina, daughter of Ferdinand Albrecht, duke of Brunswick Bevern. Frederick William gave her the palace of Schönhausen, and to the prince the county of Ruppin, and in 1734 the town of Rheinsberg, where he appears to have lived happily, chiefly devoting himself to literary pursuits and to music till his accession. Among the persons about him were Bielefeld, Chuzot, Suhm, Fouquet, Knobelsdorf, Keiserling, Jordan, and other learned men; likewise the composers Graun and Benda, and the painter Pesne. He had an uninterrupted correspondence with foreign literati, especially with Voltaire, whom he admired above all others. During his retirement at Rheinsberg, he composed several works, one of which was the 'Anti-Machiavel,' published at the Hague in 1740. The death of his father in 1740 placed him on the throne. Finding a full treasury and a powerful army, his thirst for military glory, which he himself acknowledges, tempted him to embrace any opportunity that might offer. But there did not appear to be any occasion for great enterprize till the death of the emperor Charles VI., on the 20th October, 1740, led the way to his extraordinary and brilliant career which changed the face of Europe. Frederic took this opportunity of asserting the claims of the House of Brandenburg to four principalities in Silesia, the investiture of which his predecessors had not been able to obtain; but he only required from queen Maria Theresa, the daughter and heiress of Charles VI., the duchies of Glogau and Sagan, promising on his side to support her against all her enemies, to vote for her husband's elevation to the imperial dignity, and to pay her 2,000,000 dollars. His proposals being rejected, he took possession of Lower Silesia in December, 1740, and defeated the Austrian army at Mollwitz, on the 27th April, 1741.

This victory, which nearly decided the fate of Silesia, raised up more enemies to Austria. France and Bavaria united with Prussia, and the war of the Austrian succession began. George II. king of England, the only ally of Maria Theresa, advised her to make peace with Prussia, because Frederic was her most active and formidable enemy. Frederic having obtained a victory at Czaslau on the 17th of May, 1742, over Prince Charles of Lorraine, peace was concluded at Berlin on the 28th of July, and the first Silesian war was ended. Frederic obtained the full sovereignty of Upper and Lower Silesia, and the county of Glatz, with the exception of Tropau, Jägerndorf, and Teschen. On his side, he renounced all claims to the other Austrian dominions, took upon himself a debt of 1,700,000 dollars, with which Silesia was charged, and promised to respect the rights of the Roman Catholics in Silesia. Saxony acceded to this peace, and it was guaranteed by France and England. Frederic immediately profited by it, to organize his new conquests, and to render his army more formidable. On the death of the last count of East Friesland in 1743, he took possession of that country, to which his House had a claim ever since the year 1644. When in the prosecution of the Austrian war, the Emperor Charles VII. had been obliged to fly from his hereditary dominions, and the Austrian arms were every where victorious, Frederic feared that Silesia might be taken from him. He therefore secretly entered into an alliance with France, in April, 1744, and with the emperor, the Palatinate, and Hesse Cassel, on the 22nd of May, 1744, promising to support the cause of the emperor by invading Bohemia, but requiring for himself the circle of Königgrätz in Bohemia. On the 10th of August, 1744, he unexpectedly entered Bohemia, and took Prague; but being pressed by the Austrians, under Prince Charles of Lorraine, and the Saxons, their allies, he was obliged to leave Bohemia before the end of the year. The death of the emperor Charles VII. on the 18th of January, 1745, and the defeat of the Bavarians at Pfaffenhofen, induced his son the young elector, Maximilian Joseph of Bavaria to make peace at Füssen, with Maria Theresa, and the Frankfort union was dissolved; Hesse Cassel declaring itself neutral. On the other hand, England, Austria, the Netherlands, and Saxony, had concluded a strict alliance at Warsaw on the 8th of January, 1745, and Saxony had besides entered into a special convention with Austria against Prussia, on the 18th of May, 1745. But Frederic defeated the Austrians and Saxons on the 4th of June, at Hohenfriedburg in Silesia; then entered Bohemia, and gained

another victory after a very obstinate combat at Sorr, on the 30th of September, 1745. The victory of the Prussians under Prince Leopold of Dessau, over the Saxons at Kesselsdorf, on the 15th of December, led to the treaty of Dresden, December 25, 1745, which was concluded on the basis of the treaty of Berlin; so that Frederic retained Silesia, acknowledged the husband of Maria Theresa, Francis I., as emperor, and Saxony engaged to pay to Prussia one million of dollars. Thus ended the second Silesian war.

During the eleven years' peace that followed, Frederic devoted himself with unremitting activity to the internal administration of his dominions, the organization of the army, and to literary pursuits. Among the grand improvements which he contemplated was a reform in the judicial proceedings, with a view to render them more simple and uniform, in all the different provinces of his dominions. Together with his chancellor Coccei, he compiled the 'Frederician Code, a body of laws for the dominions of the king of Prussia, founded on reason and the Constitution of the country.' It is not easy to understand what is here meant by the word 'Constitution.' His father, it is true, drew up with great care what he called a constitution (Verfassungs-Urkunde), or instructions for the supreme general board of finance, war, and domains, which he issued in 1722. This valuable document has been discovered, and, for the first time, published in 100 pages, by Dr. Förster, in his 'Life of Frederic William I.,' but it is not likely that this is here alluded to. Frederic also wrote 'Memoirs of the House of Brandenburg,' a concise account of his House, written in a good style, with a positive declaration of impartiality, which it seems to merit; though the writer may have been at times betrayed by prejudices into unintentional misrepresentations of incidental facts. Another work, a didactic poem in six books, on the Art of War, is his most considerable poetical production, and is greatly esteemed. These, and all his other works are in French. These recreations did not divert his attention from those paramount duties which he always performed with the most persevering care. Instead of indulging in the pleasures of the chase, he made journeys to different parts of his dominions. He endeavoured to make agriculture, manufactures, and the arts flourish; and encouraged commerce, the true principles of which however he appears not to have understood. Though possessing no naval force, he insisted on the right of free navigation for his subjects, without molestation from the fleets of contending parties. One grand object was to improve his revenues, a measure necessary for the maintenance of his army, which he had increased to 160,000. He expended large sums in gratifying his taste for the arts, by decorating the palaces of Berlin and Potsdam, and in erecting many splendid edifices in those two places, in which, however, there was this incongruity, that the richest architectural decorations were often lavished on the exterior of buildings which were only barracks for the troops.

When the war broke out between England and France in 1755, the former concluded a treaty with the king, the chief object of which was to secure Hanover from invasion. This led to a secret alliance between France, Austria, Saxony, and Russia, of which Frederic, having been privately informed, chiefly through the treachery of a clerk in the Saxon chancery, became apprehensive of an attack, and of the loss of Silesia. He accordingly resolved to anticipate his enemies, and commenced operations by invading Saxony on the 24th of August, 1756; which was the beginning of the third Silesian, or, as it is generally called, 'The Seven Years' War.' This contest was the most extraordinary and important in modern times, previous to those of the French Revolution. Though Frederic is the hero, the history of the war is, in fact, the history of continental Europe. Frederic, intending to invade Bohemia, required a passage through Saxony, which the elector king of Poland anticipating, assembled his troops in an intrenched camp at Pirna. Frederic invested it, and having defeated, at Lowositz, the Austrians who came to its relief, it surrendered; and he compelled all the privates to enlist in his own army. In 1757, he advanced into Bohemia, gained, on the 5th of May, a great victory at Prague, over the Austrians, under Prince Charles of Lorraine and Marshal Brown. The Austrians took shelter in Prague, which Frederic immediately invested; but the approach of the Austrians, under Marshal Daun, changed the face of the campaign. Daun formed an intrenched camp at Kolin, which Frederic attacked, but was defeated with great loss, on which he raised the siege of Prague, and retreated into Saxony. In the mean time the French compelled the Duke of Cumberland to abandon Hanover, of which they took possession; and about the same time the Russians and Swedes invaded Prussia from the north: but though Frederic's affairs were supposed by his enemies to be desperate, he was not dismayed. He first attacked the united French and Austrian army, twice as numerous as his own, at Rosbach, and gave them a total and most disgraceful defeat. He then marched into Silesia, where the Austrians had taken Breslau, gained a great victory over them at Lissa, and recovered Breslau. The Russians and Swedes had retreated from the Prussian territories, and the Hanoverians had assembled a large force under Prince Ferdinand of Brunswick, to co-operate with the Prussians. Thus at the close of 1757 the king's affairs were so far restored, that he might have hoped for success in the next campaign, if he could have kept back the Russians; but the enmity of the empress Elizabeth was inveterate. However, the admiration which Frederic's conduct had excited in England, and confidence in his ability, induced the English government to grant him a subsidy of 670,000*l.*, which became an annual grant. In the campaign of 1758 the principal event was the sanguinary battle at Zorndorf, between the Prussians and the Russians, in which the latter were defeated, but the loss on both sides was immense. In 1759 the king's first object was to stop the progress of the Russians, who advanced to Frankfort on the Oder. On the 12th of August was fought the battle of Kunnersdorf. At the beginning of the day, the king of Prussia thought himself so sure of the victory, that he despatched a letter to that effect to the queen at Berlin; but in the end, he was obliged to quit the field, and wrote a second letter to the queen, desiring her to send away the royal family, and to have the archives removed, adding, that the city might make terms with the enemy. But Berlin was saved. Frederic's skilful conduct after his defeat induced the Russian general, instead of entering Brandenburg, to join the Austrians in Lusatia; but soon afterwards, General Finck, with 15,000 men, was taken prisoner by the Austrians, and a smaller corps shared the same fate. Frederic, however, received reinforcements, and Marshal Daun was contented to occupy the camp at Pirna and cover Dresden. In the following spring some fruitless negotiations for peace took place. In this campaign the city of Dresden suffered very severely from a bombardment, by which Frederic destroyed the finest part of the city. On the other hand, the Russians and Austrians entered Berlin, which was saved from plunder by a composition, but had to pay heavy contributions. Berlin was soon evacuated, and Frederic, who was hastening to its relief, turned into Saxony, where he was induced, by the desperate condition of his affairs, to venture to attack the Austrians, who were strongly posted at Torgau. He defeated them, after an obstinate battle, which compelled them to retreat. The Russians and Swedes also quitted his dominions, and he was able to recover strength in winter quarters in Saxony.

At the commencement of 1761 it was evident that the king of Prussia's situation was most critical. He confessed himself, that after the great losses he had sustained, his army was not equal to what it had formerly been. He accordingly occupied a strong camp in Silesia, where he remained immoveable, watching his enemies, but was unable to prevent Marshal Laudohn from taking Schweidnitz, and the Russians, Colberg. Frederic's situation was now so desperate, that he appears to have seriously contemplated suicide: in this critical state, the only event perhaps which could have saved him, occurred. This was the death of the Empress Elizabeth on the 5th January, 1762, and the accession of Peter III., who was an enthusiastic admirer of Frederic, with whom he immediately concluded a treaty of alliance. Peace was also made with the Swedes, and though Peter was soon deposed, yet Catherine, who succeeded him, observed a strict neutrality during the remainder of the war. The king and his brother, Prince Henry, gained several advantages in 1762 and 1763, and peace having been concluded between Great Britain and France, Austria was left alone, and the empress queen obliged to conclude peace with Prussia. The two powers mutually guaranteed the whole of each other's German dominions, Frederic only promising to give his vote to Joseph as king of the Romans. The king of Poland was restored to his

dominions without compensation. Thus ended the Seven Years' War, which, after immense sacrifices of human life and treasure, left the political balance of Europe unchanged.

The issue of this great contest, in which the genius of Frederic had been so eminently distinguished, secured to him a decisive influence in the affairs, not only of Germany, but of all Europe. Returning to his capital after an absence of more than six years, he seriously directed his attention to repair the evils inflicted on his dominions by the war. He opened his magazines to give his subjects corn, both for food and for seed. He distributed horses among the farmers, rebuilt at his own expense the houses which had been burnt, founded colonies, erected manufactories, and made canals for the convenience of inland trade. Silesia was exempted from the payment of all taxes for six years, and the New Mark and Pomerania for two years. To relieve the nobility in those three provinces, a system of credit was introduced, by which the value of estates was raised, and the rate of interest reduced. In 1764 he founded the bank of Berlin, to which he gave eight millions of dollars as its first fund. Though he really desired to promote trade, he appears to have been unacquainted with the true principles of commerce; and this, united with his desire to increase the revenue, induced him to take measures, some of which were injudicious, and others decidedly unjust: for instance, the debasement of the current coin. Meantime he continued to maintain a very large army. In March, 1764, he concluded an alliance with Russia, by which he supported the election of the new king of Poland, Stanislaus Poniatowski, and the cause of the oppressed dissidents in Poland. In 1772 he agreed to the first partition of Poland, by which he obtained all Polish Prussia (which was ceded in 1466 by the Teutonic Order to Poland) and a part of Great Poland, as far as to the river Netz, but with the exception of Danzig and Thorn. Frederic has been accused of having first suggested the partition of Poland; but the fact is, that Frederic I. had formed a plan for the partition of Poland, drawn up in the year 1710. From that time the kingdom of Prussia was divided into East and West Prussia. In 1778, on the death of the elector of Bavaria, without children, he interfered to prevent Austria from partitioning that country. The war was, however, terminated without a battle, by the treaty of Teschen, in May, 1779, by which Austria renounced its intentions, and consented to the union of the Franconian principalities with Prussia. In 1785, the emperor having formed a plan to obtain Bavaria in exchange for the Low Countries, Frederic defeated it in conjunction with Saxony and Hanover, by concluding the alliance between the German princes, called the "Fürstenbund," which has been considered as the master-piece of his policy. In 1786 he concluded a treaty of amity and commerce with the United States of America. Though he had long suffered from gout and asthma, which terminated in confirmed dropsy, not a little aggravated by his indulgence in the pleasures of the table, he continued his unremitted attention to public affairs till within two days of his death, the approach of which he contemplated with composure; he died on the 17th of August, 1786, at his favourite palace of Sans Souci, in the 75th year of his age, and the 47th of his reign, leaving to his nephew, Frederic William II., a kingdom enlarged, from 2190 to 3515 German square miles; above 70 millions of dollars (10 millions sterling) in the treasury; and an army of 200,000 men.

The character of Frederic II., and his public and private life, have furnished the subject for numerous publications in all the European languages, which are perfectly familiar to most classes of readers. One of his great merits was, that he did not contract any public debt, and though he raised a very large revenue, yet a considerable part returned into the pockets of his subjects, through various channels. Among his defects may be reckoned his contempt for religious institutions, which was considered by his contemporaries a want of respect for religion itself. He was avowedly an unbeliever in revealed religion, and his notions respecting natural religion appear to have been vague and fluctuating. With respect to his temper, he seems to have been deficient in real sensibility; and though many examples of his clemency and placability are recorded, he was at times harsh and even cruel. His moral conduct was guided generally by his pleasure and his interest, and that, as well as his religion, were greatly influenced by his predilection for French literature, and especially his intimacy with and admiration of Voltaire. Proud as the Germans in general are of Frederic, they cannot help regretting his contempt of German literature, to the improvement of which he contributed nothing. It must, however, be owned that German literature, at the commencement of Frederic's life, was in a very low state, and it may be doubted whether the literature and language of Germany did not gain rather than lose by his neglect of them. Frederic was essentially a despot, and his interference with what he confessedly did not understand, would probably have done more harm than good. His voluminous works, all in French, would have entitled him to distinction in the literary world, even if he had not been a king. Besides the works already mentioned, he published military instructions, and some miscellaneous pieces in four volumes octavo. His posthumous works, in 15 volumes, contain the history of his own times, the history of the Seven Years' War, and memoirs, from the Treaty of Hubertsburg, 1763, to the end of the partition of Poland.

FREDERIC WILLIAM II., king of Prussia, was born in 1744. His father was Augustus William, second son of Frederic William I., upon whose death in 1758, his uncle, Frederic the Great, declared him Crown Prince of Prussia. The young prince soon indulged in a mode of life which was highly displeasing to his uncle, and alienated them from each other for many years. Frederic II. however expressed his satisfaction to the crown prince, on his giving proofs of personal bravery in the war of the Bavarian succession, 1778. Frederic William's first wife was Elizabeth Christina Ulrica, princess of Brunswick, from whom he was separated in 1769, and afterwards married the Princess Louisa of Hesse Darmstadt. His accession in 1786 was under favourable circumstances. Prussia was engaged in no contest with foreign enemies, and the policy of Frederic II. had made him, in the latter part of his life, in some measure an arbitrator in the affairs of Europe. Political errors soon lessened his credit with foreign cabinets, and the treasure left by his uncle was wasted in useless wars, and by the extravagance of his favourites. His first interference in foreign affairs was in 1787, when he sent an army, under Duke Charles William Ferdinand of Brunswick, to Holland, where the patriots refused to recognise the right of the stadtholder, and insulted his wife, Frederic William's sister, on her way to the Hague, for which however satisfaction had been given. The Prussians advanced without opposition to Amsterdam, and the old order of things was soon restored, upon which a defensive alliance between England, Prussia, and Holland was concluded at the Hague in April, 1788. In the war between Sweden and Russia in the same year, Frederic William, in conjunction with England, prevented any further attack upon Sweden by Denmark. Being jealous of the success of Russia and Austria in the Turkish war, he concluded an alliance with the Porte in 1790, and guaranteed its possessions. This measure having given offence to Austria, a Prussian army was assembled in Silesia, on the Bohemian frontier, and an Austrian army in Bohemia. The Emperor Leopold II. did not wish for war with Prussia, and in the convention concluded at Reichenbach on the 27th July, 1790, between Austria and Prussia, with the mediation of England and Holland, he promised to restore to the Turks all his conquests, except the district of Aluta, on which conditions peace was made between Austria and the Porte at Szistowe. Some differences respecting this convention were arranged by Leopold II. and Frederick William at their meeting at Pillnitz, in August, 1794, when they entered into a closer union with respect to the affairs of France.

A part of the Polish nation, with King Stanislaus Poniatowsky at its head, proposed to establish a new constitution for the kingdom, and to make the royal dignity hereditary in the house of Saxony. In order to secure foreign aid, an alliance was concluded between Poland and Prussia, by which the latter recognised the integrity of Poland, and promised to assist it with 40,000 infantry and 4000 cavalry, in case any foreign power should interfere in its internal affairs. After making peace with the Porte, Catherine II., who, without taking any share in the war then carrying on by Prussia and Austria against France, had calculated on their efforts, contrived to reduce Frederic William to the alternative either

of defending Poland against Russia by virtue of his alliance with that state, or of making a second partition of it, in conjunction with Russia. Frederic William chose the latter, and in January, 1793, sent troops, under General Möllendorf, into Great Poland, which occupied a tract of country of the extent of 1100 German square miles, with a population, including Danzig and Thorn, of 1,200,000 inhabitants. Though the diet at Grodno was obliged to agree to this accession, as well as to a similar cession of territory to Russia, the Poles rose in 1794, under Kosciuszko and Madalinsky, to recover their independence, in which insurrection the Russians and Prussians were several times defeated, till Kosciuszko was taken prisoner on the 10th October, by the Russian General Fersen, and Praga was stormed by Suwaroff on the 4th November. Hereupon the third partition of Poland followed. All that remained, after the preceding partitions, was divided between Austria, Russia, and Prussia, by which the latter acquired a large addition of territory, and the independence of Poland was annihilated. In the war against France, Prussia sent 50,000 men to the Rhine in 1792, under the duke of Brunswick, and the king soon followed, accompanied by the princes. The duke of Brunswick failed in his plan of marching to Paris, and was obliged to retreat. On the 5th April, 1795, Prussia made peace with the Republic, and left all its territories beyond the Rhine in the possession of the French. To preserve the neutrality of the north of Germany, a convention was made between Prussia and several princes, whose territories were included in what was called the line of demarcation. During this reign the margrave of Anspach and Baireuth, who was the last prince of that line of the house of Brandenburg, ceded those principalities, for an annuity of 500,000 florins, to Frederic William, who on that occasion revived the order of the Red Eagle. In the internal administration, the French system of indirect taxes introduced by Frederic II. was abolished. Many judicious arrangements were introduced, and a new code of laws for the whole kingdom published; but the toleration promoted by Frederic II. was much restricted by Wöllner and other persons about the king, by means of the religious edict of 1788 and other measures. Frederic William died on the 16th of November, 1797, and was succeeded by his eldest son, the present King Frederic William III., whose eventful reign has been distinguished by vicissitudes of ill fortune and success at least equal to those experienced by his great predecessor.

FREDERIC AUGUSTUS I. of Poland. [Augustus II., p. 96.]

FREDERIC AUGUSTUS II. of Poland. [Augustus III., p. 98.]

FREDERIC AUGUSTUS I., king of Saxony, eldest son of the Elector Frederic Christian, born at Dresden on the 23rd of December, 1750, succeeded his father 17th of December, 1763, under the guardianship of his uncle Prince Xavier, till he assumed the government in 1768. In 1769 he married the Princess Maria Amelia of Deuxponts. He began his reign with a firm resolution, to which he remained faithful under all circumstances and at all times, to do everything in his power to promote the happiness of his people. In the whole of his long reign there was no act of despotism, no violation of the rights of others. Averse from innovation, he undertook nothing through ostentation or mere imitation, but new institutions arose only when he had become convinced of their utility. He gradually diminished the debts of the country; and the strict integrity of his administration caused the Saxon funds, though the interest was low, to be several per cent. above par. He often prevented the country from contracting debts by personal sacrifices, endeavoured to decrease rather than to raise the taxes, and never suffered his interest and that of his treasury to be opposed to the interests of his subjects. During the dreadful dearth in 1772, 1804, and 1805, and the inundations in 1784, 1799, and 1804, the king gave particular proofs of his paternal care for his people. Agriculture, the improvement of the breed of cattle, especially of the sheep, made considerable progress and were encouraged by premiums. The mines, the salt-works, and the forests were improved by careful superintendence and wise laws. Manufactures were encouraged; commerce, which had suffered severely during the seven years' war and by the duties imposed, during his minority, upon foreign goods, became flourishing to a degree hitherto unknown. The army was placed upon a better footing, excellent institutions established for the education of officers, and a military penal code was compiled. Extensive support was given to the universities of Wittenberg and Leipzig, the schools of Pforta-Meissen and Grimma were reorganized, the seminaries at Dresden and Weissenfels, the institutions for the sons of soldiers at Annaberg, and the elementary mining-schools in the Erzgebirge were founded, and the mining-academy at Freiberg better organized. In his legislation Frederic's government appears in a very favourable light. Torture was abolished in 1770; the number of oaths in courts of justice was diminished; the punishment of death restricted and made less cruel. Important changes were also made with respect to several public boards; salutary police laws and a general ordinance on guardianship were issued; orphan-houses, workhouses, dispensaries, &c. were founded. The spirit of integrity, order, temperance, and fidelity so generally prevailed, that Saxony was eminently distinguished for the morality of its inhabitants. Notwithstanding his love of peace, he was more than once obliged to take part in the wars of other powers. Thus, in 1778, the claims of his mother on the succession of her brother the elector of Bavaria made him join Frederic the Great against Austria. The welfare of his country and its geographical position required him to be united with Prussia, on which account he joined the Fürstenbund. Similar considerations induced him to refuse the crown of Poland, which the Poles offered to him and his successors in 1791. He took no part in the war against France farther than furnishing his contingent as a prince of the empire; and in 1796 acceded to the armistice and treaty of Neuchatel with France, and stationed a cordon of troops on the line of demarcation, on his southern frontier. He took no part in the new war between Austria and France in 1805; but when the German empire was dissolved, on the 6th of August, 1806, he was obliged to furnish Prussia with 22,000 men against France. After the battle of Jena Saxony was abandoned to the French. Napoleon, besides various requisitions, levied a contribution of 25 millions of francs and established a provisional administration of the sequestrated revenues, but allowed the country to remain neutral; and its fate would doubtless have been very different but for the respect with which the private and public virtues of the king inspired even his enemies. Frederic assisted his distressed subjects from his private property, concluded a treaty of peace with Napoleon at Bonn in December, 1806, assumed the title of king, joined the Rhenish Confederation, and furnished 20,000 men as his contingent. By the treaty of Tilsit in 1807 he obtained a large portion of Prussian Poland, by the name of the grand duchy of Warsaw. He was bound to take part with France in its wars, but sent no troops to Spain; and in the war with Austria in 1809 he furnished only his contingent. In 1813 his dominions became the theatre of war. On the entrance of the allies into Saxony he retired to Plauen, thence to Ratisbon, and thence to Prague; but the menaces of Napoleon compelled him to return to Dresden; he afterwards followed Napoleon to Leipzig. That town being taken by the allies after the defeat of the French on the 18th and 19th of October, Alexander intimated to him that he considered him as his prisoner. The result is well known. In spite of his remonstrances and representations, and of the high estimation in which his character was held, he was deprived of a large portion of his kingdom, which was given to Prussia under the title of the grand duchy of Saxony. He returned to his capital on the 7th of June, 1815, founded, in commemoration of that event, the order of Civil Merit, and devoted all his attention to repair the injuries caused by the war. In September, 1818, he celebrated the fiftieth anniversary of his assuming the government, and in January, 1819, that of his marriage. He died on the 5th of May, 1827, in the seventy-seventh year of his age and the sixty-fourth of his reign.

FREDERIC WILLIAM CHARLES, king of Würtemberg, was born at Treptow in Pomerania in 1754, succeeded his father Frederic Eugene as duke of Würtemberg in 1797, became elector in 1803, and assumed the royal title on the 1st of January, 1806. In 1780 he married Augusta Caroline Frederica Louisa, princess of Brunswick Wolfenbüttel, by whom he had two sons, William, the present king, and Paul, and a daughter Catherine, who was married to Jerome Bonaparte, king of Westphalia. As his father was personally engaged in the seven years' war in the armies of Prussia, his early education was directed with infinite care

by his mother, Sophia Dorothea, daughter of the margrave of Brandenburg-Schwedt, a highly-accomplished and excellent princess. After the peace in 1763 his father was at leisure to attend to the education of his son, who possessed extraordinary natural abilities. He was however brought up in many respects on the French model, to which his four years' residence at Lausanne contributed. He spoke and wrote French with the greatest fluency and correctness; but he esteemed the literature of his own country, and spoke and wrote German in the same perfection as French. His natural eloquence was aided by an extraordinary memory; he was well versed in mathematics, natural philosophy, history, and geography, and cultivated his taste for the fine arts, especially in his journey to Italy in 1782; but with too much vivacity for calm examination, he often hastily adopted a false view, and was thus led in his subsequent life into many errors. In many points he took Frederic the Great for his model. As well as his seven brothers he entered the Prussian service, and in the war of the Bavarian succession attained the rank of major-general. After his return from Italy, whither he accompanied his sister and her husband the Grand Duke Paul of Russia, he was made lieutenant-general, and governor-general of Russian Finland. He renounced this connexion in 1787, and lived first at Monrepos, near Lausanne, and then at Bodenheim, near Mentz. He witnessed at Versailles the first proceedings of the National Assembly. When his father, after the death of two brothers without male descendants, became duke of Würtemberg, in 1795, Frederic, as crown prince, opposed in 1796 the entrance of the French into Franconia, but was defeated. After this event he lived for a time at Anspach, then at Vienna and London, where, in 1797, he married her royal highness Charlotte Augusta Matilda, princess royal of England, with whom he returned to Stuttgard in June the same year.

When he succeeded to the government, in December, 1797, his duchy, which had already suffered severely in the war with France, was 153 German (about 3000 English) square miles in extent, with 600,000 inhabitants. In 1799-1801 the sufferings of the country were still greater. Frederic however, by his interest at the courts of Vienna and Petersburg, obtained by the decision of the German diet of the 23rd of February, 1803, besides the electoral dignity, an ample indemnity for his l[illegible]rritory on the left bank of the Rhine. The chief obj[illegible] policy was to preserve and extend his dominions. On the 2nd of October, 1805, Napoleon arrived at Ludwigslust, and on the following day issued the declaration of war against Austria. Frederic was compelled to join France, and furnished 8000 men. By steadily adhering to the system of Napoleon he acquired in and after the peace of Presburg the possession of an independent kingdom of the extent of 368 (nearly 7400) square miles, with 1,400,000 inhabitants. After he had assumed the title of king, on New Year's Day, 1806, he published the organization of his greatly-enlarged dominions, by which one uniform system of administration was introduced into the old and new provinces. Desirable as this might be (and he is highly commended for it by some writers), it certainly did not give satisfaction to all his subjects. Accustomed, and indeed compelled, to act with energy in his foreign affairs, he sought to make everything in his internal government bend to his will, without regard to long-cherished prejudices or even to long-established rights. He of necessity joined the Rhenish Confederation, was at the meeting of Napoleon and Alexander and the greatest princes of Germany at Erfurt in October, 1808, and in the campaign of 1812 furnished his contingent as member of the confederation. After the battle of Leipsig he formally renounced, in November, 1813, the Rhenish Confederation, and joined the allied powers against France. He went in person to the congress at Vienna, where he was received with the greatest respect by the assembled sovereigns. In the thirteenth article of the act of congress it was enacted that representative assemblies should be introduced into all the states of Germany—a benefit for which Germany is in great measure indebted to the prince regent of England. The king of Würtemberg (though he did not accede to the German Confederation till the 1st of September, 1815) drew up a constitution, which he presented as an ordinance to the states which he had convoked; but it was unanimously rejected: the deputies required the antient constitution, and speedy relief for the miseries of the people. Accustomed to implicit obedience, and not a little astonished at this behaviour, he still redressed many grievances, and after dissolving the assembly in August, 1816, he called another in October, and unexpectedly prescribed fourteen propositions as the basis of a constitution, which were very favourably received by the people. A new constitution was drawn up; but before it could be discussed he died, on the 30th of October, 1816, in the sixty-second year of his age and the nineteenth of his reign. His character was essentially despotic, but he had too much good sense and too enlightened an understanding to be systematically a tyrant. He desired the good of his people, of the means of promoting which he conceived himself to be the best judge. It must be said to his praise that his edict of the 15th of October, 1806, secured to all his Christian subjects equal security for their rights and the free exercise of their religious worship. He introduced neither French laws nor French forms of administration; everything in Würtemberg remained *German;* and Würtemberg was happily preserved from the degradation of becoming a French province.

FREDERIC WILLIAM, Duke of Brunswick, the fourth and youngest son of Charles William Ferdinand, was born October 9, 1771, and educated for the military profession. In 1786 the king of Prussia named him successor of his uncle Frederic Augustus duke of Oels and Bernstadt, who died in 1805. He went to Lausanne, spent two years in Switzerland, and on his return was made captain in a Prussian regiment of infantry. In 1792 he was with the Prussian army in France, and was twice wounded. After the peace of Basle he obtained a regiment, and in 1804 married the princess Mary of Baden, by whom he had two sons, Charles and William. After 1806 he took part in the war against France, with all the ardour which the oppression of Germany and his father's unhappy fate inspired. He was taken prisoner with Blücher at Lübeck. His eldest brother the hereditary duke dying without children in September, 1806, and his two other unmarried brothers having been declared incapable of reigning on account of incurable blindness, he would have succeeded to the government of Brunswick on the death of his father; but the peace of Tilsit and the will of Napoleon decided otherwise. From that time he lived at Bruchsal, where he lost his consort in April, 1808. At the beginning of the war between France and Austria in 1809, he raised a free corps in Bohemia. After the total defeat of the Austrians, the duke resolved to leave Germany, and with a corps of 700 cavalry and 800 infantry, commenced in July that memorable and masterly retreat which gained him such deserved reputation. After some skirmishes he reached Brunswick on the 31st of July, but did not enter the city. There was no time for rest; three bodies of troops, each much more numerous than his own, were advancing against him. On the 1st of August the Westphalian general Reubel met the duke at the village of Oelper, near Brunswick, and a battle ensued, in which Reubel's 4000 men not only yielded to the 1500 Brunswickers, but left the only way open by which they could escape. By a series of skilful manœuvring the duke deceived his pursuers, crossed the Weser, broke down the bridge behind him, and having completely baffled his enemies, reached Elsfleth on the 6th of August, where he took possession of a sufficient number of vessels in which he embarked his troops during the night, and on the 7th in the morning, hoisting English colours, sailed for Heligoland, where he arrived on the 8th, and on the 10th proceeded with his corps to England. He was received in England with the greatest joy; his troops were taken into the English service and employed in the Peninsula, where they distinguished themselves. The duke had a pension of 6000*l.* a-year granted by the parliament till he returned to his own dominions in December, 1813, where he was received with extraordinary enthusiasm, and with expectations which he was unhappily unable to fulfil. He was one of the most liberal and noble-minded princes of his age. He was sincerely desirous of promoting the welfare of his subjects; but, wanting to accomplish it at once, he overlooked the ordinary forms; finding nothing to support him in the constitution of the country, which had been completely changed, and being surrounded by interested or prejudiced counsellors, numerous mistakes were committed. His military establishment was too great for the dilapidated state of the finances, and indifference, if not aversion, took the place of the affection of his people. The rest is known. With his famous Black Hussars he joined the duke of Wel-

lington in 1815, and fell gloriously at Quatre-Bras on the 16th of June, 1815.

FREDERICK I., king of Denmark, son of Christian I., was born 1473. His father had made him duke of Sleswick, Holstein, Stormar, and Dithmarsh, but his elder brother, King John, stripped him of half his dominions. During the reign of his nephew, Christian II., he behaved with great caution, but that sanguinary tyrant being deposed in 1523, he was declared king in his stead. He was encouraged to lay claim to the crown of Sweden, but prudently made a treaty of friendship with that kingdom, where Gustavus Vasa was too firmly established to be dispossessed without a severe struggle. Frederick however succeeded in annexing the isle of Gothland to his dominions. In 1527 Frederick embraced the Lutheran religion, and established it in his dominions. He died in 1533, at the age of sixty, and is highly commended by the historians of his country for the justice and moderation of his government.

FREDERICK II., king of Denmark, was born in 1534, and succeeded to the crown on the death of his father, Christian III., in 1558. Soon after his accession he joined his brother, the duke of Holstein, in a war against the inhabitants of Dithmarsh, who had declared themselves independent, but were subdued after a brave resistance. In 1563 hostilities commenced between him and Eric king of Sweden, which were carried on with great bitterness and cruel devastation of the two kingdoms, till Eric was deposed by his own subjects in 1568. In 1570 a treaty advantageous to Denmark was concluded. Soon after this, Frederick married the daughter of the duke of Mecklenberg, and from that time gave all his care to the preservation of peace and the promotion of the welfare and happiness of his subjects. He enlarged the University of Copenhagen, and patronised learned men, among whom was Tycho Brahe, the celebrated astronomer. He was highly respected by neighbouring princes; he received the order of the Garter from Queen Elizabeth, and concluded a treaty with James VI., king of Scotland (James I. of England), for the marriage of his daughter to that prince. He died in 1588, with a high character both public and private.

FREDERICK III., king of Denmark, son of Christian IV., was born in 1609. He was made archbishop of Bremen, but his elder brother dying before their father, he succeeded to the crown, 1648. The nobles, who had become very powerful, made him enter into an agreement with them on his accession, by which his power was very much restricted. The wars of the last reign having brought the kingdom to a very low condition, one of Frederick's first measures was to make a treaty with the Dutch, whose friendship he gained by seizing a fleet of English merchantmen, laden with naval stores, in the harbour of Copenhagen. By this he obtained a subsidy, and an alliance with Holland, though it embroiled him with the Commonwealth of England. In 1657, at the instigation of the Dutch, he declared war against Sweden, whose warlike sovereign, Charles Gustavus, crossed over the ice to Zealand, and laid siege to Copenhagen, which was in a very bad state of defence; and Frederick, notwithstanding his courage and energy, was compelled to make peace on disadvantageous terms, under the mediation of England and Holland. This peace was of short duration; Copenhagen was again besieged by sea and land, and was saved only by the arrival of a Dutch fleet. The mediating powers again interfered, but peace was not concluded till after the death of Charles, 1662.

The most remarkable and important event in the reign of Frederick III. was the change of the constitution, which had been limited, and in some degree elective, into an hereditary and absolute monarchy. This change was owing to the arrogance and selfishness of the nobles, who treated the commons as their vassals, and refused to bear any part of the public burdens. The commons therefore, in conjunction with the clergy, resolved to surrender the liberties of the nation and ask the consent of the king, who readily accepted the offer, and the nobles, having been overawed by the army, were obliged to concur. The rights and privileges of the estates were solemnly surrendered, and the king and royal family received the homage of the several orders. By this bloodless revolution Frederick obtained absolute authority; and whatever we may think of the people who ventured on so hazardous an experiment, it must be owned that the Danish monarchs have not abused the confidence thus reposed in them. Frederick died in 1670, leaving a numerous family by his queen, a daughter of George duke of Brunswick Lüneburg.

FREDERICK IV., king of Denmark, was born in 1671, and succeeded his father, Christian V., in 1699, and immediately attacked the dominions of the Duke of Holstein. He laid seige to Tonningen in person, but was soon obliged to return and defend Copenhagen against Charles XII. of Sweden, brother-in-law to the duke of Holstein, whose first military exploit was this invasion of Zealand. Frederick was obliged to conclude peace, engaging to indemnify the duke of Holstein for all the loss he had caused him, and fully to recognise his title to the sovereignty of his dominions. When Charles was afterwards a fugitive in Turkey, Frederick joined the league against him, but his troops were totally defeated in Schonen. He then invaded Swedish Pomerania, in which he met with little success; and though he afterwards made himself master of the duchy of Bremen, his army, united with that of Saxony, was defeated by the Swedes under general Steenbock, who destroyed the town of Altona. In 1714 and 1718 the Danes were more fortunate, and drove the Swedes from Norway. Peace was concluded in 1720, under the mediation of England, on favourable terms, Frederick retaining the duchy of Sleswick. From him his dominions enjoyed the blessings of peace, and his whole attention was devoted to the advancement of their prosperity. He died in 1730. He was an able prince, but too much given to enterprises too great for the resources of his dominions.

FREDERICK V., king of Denmark, born in 1723, succeeded his father, Christian VI., in 1746. Continuing the judicious policy of his father, he preserved his dominions in peace, increased the wealth of his people and the public revenues, by encouraging manufactures and commerce; entered into commercial treaties with foreign powers, established a Greenland company, laid open the trade to the American colonies to all his subjects, and improved the internal prosperity of the kingdom by encouraging agriculture, &c. He was equally zealous in the promotion of the arts and sciences. He founded an academy at Soroe, and seminaries at Drontheim and Bergen for the instruction of the Laplanders. He likewise established academies of painting, sculpture, and architecture, and sent a number of learned men, among whom was the celebrated Niebuhr, to the East. He was in every respect one of the wisest and best monarchs of his age, and is said to have consoled himself on his death-bed with the reflection that he had never injured a single individual, nor had a drop of blood to answer for. He died in 1766, having been twice married, first to Louisa, daughter of George II. of England, and then to Juliana, daughter of the duke of Brunswick-Wolfenbuttel.

FREDERICA. [RIBE.]

FREDERICKSBURG. [VIRGINIA.]

FREDERICKSHALL. [CHRISTIANIA.]

FREDERICKSTADT. [CHRISTIANIA.]

FREDERICKTOWN. [MARYLAND.]

FREDRO, MAXIMILIAN, palatine of Podolia, a celebrated Polish author, who died in 1676. He spent his life in serving his country, in the camp as well as in the council, and occupied many important posts. His active life gave him excellent opportunities for making observations on many subjects connected with war and politics; which he has transmitted to posterity in his works, which are chiefly in Latin. His writings are full of interesting details, his observations are shrewd, and his opinions on various subjects are remarkably sound; whilst the vigour and conciseness of his style procured for him the name of the Polish Tacitus. His principal works are, 1. 'Vir Consilii monitis ethicorum, nec non prudentiæ civilis discendum instructus;' 2. 'Monita politico-moralia et icon ingeniorum;' 3. 'Militarium seu axiomatum belli ad harmoniam togæ accommodatorum libri;' 4. 'Fragmenta Scriptorum togæ et belli;' 5. 'Considerations on the Military service,' in Polish; 6. 'Proverbs and Advice, moral, political, and military,' in Polish. This last work, which is very popular in Poland, has mainly contributed to establish the reputation of Fredro, who has here displayed an extraordinary knowledge of the world, and an intimate acquaintance with the habits and character of all ranks of society.

FREE BENCH is the widow's share of her husband's copyhold or customary lands, according to the custom of the particular manor of which the lands are holden. [COPYHOLD.] As dower is not an incident to copyhold tenure

the quantity and duration of the widow's interest are regulated by the various customs; it is generally a third for her life, but in other manors it is a fourth part, and sometimes only a portion of the rent. By other customs she takes the whole for her life, and in the manor of Taunton Deane, in Somersetshire, the wife takes the inheritance. In some manors the widow has only a right to Free Bench out of the lands of which her husband died seised; in others, her right attaches upon all the lands held of the manor of which he was seised during the coverture. Frequently her estate is during widowhood only, and sometimes during chaste widowhood. In the manors of East and West Enborne in Berkshire, and Torre in Devonshire, and in some other parts of the West of England, there is the ludicrous custom that where a widow has forfeited her Free Bench for incontinency, if she will come into court riding backwards on a black ram with his tail in her hand, and repeating certain verses more significant than decent, ending with 'Therefore pray, Mr. Steward, let me have my land again,' the steward is bound to re-admit her to her Free Bench. (*Cowel's Interp.; Scriven on Copyholds.*)

FREE SCHOOL. [SCHOOL.]

FREE WILL. [WILL.]

FREEDMAN. [SLAVE.]

FREEHOLD. An estate of freehold is defined by Britton to be 'the possession of the soil by a freeman;' and by Sir William Blackstone, as 'such an estate in lands as is conveyed by livery of seisin, or in tenements of an incorporeal nature by what is equivalent thereto.' Neither of these definitions is sufficiently precise; both are the consequence of the tenure, not the tenure itself.

A freehold, 'liberum tenementum,' was simply an estate for life in tail or in fee, held by a freeman independently of the will and caprice of the feudal lord, and the term was used in contradistinction to the interest of terms for years, and lands in villenage or copyhold [COPYHOLD], which might be determined by the lord at pleasure. The older law writers distinguished freeholds as of two kinds, in deed and in law; the first being the actual possession of lands for an estate of freehold; and the other, the right to such lands before actual possession taken. Sir William Blackstone divides them also into freehold estates of inheritance, and freehold estates not of inheritance. [ESTATE.] Neither of these divisions is of any real importance. The true definition of a freehold is, an estate in lands or tenements in fee simple, in tail, for the term of the life of the holder, or for the life of another person, in dower or by the curtesy. [CURTESY; DOWER; ESTATE.] Some offices also, held for life or in fee, are of freehold tenure. (*2 Bl. Comm.; Co. Litt.*)

FREESTONE. [SANDSTONE.]

FREEZING is the solidification of fluid bodies by the abstraction of the heat necessary to their fluid form. It occurs by the effect of natural cold in many liquids; and most of them may be frozen by an artificial reduction of temperature. It is to be observed that what are termed the *freezing points* vary greatly in different fluids, and their remaining such at different temperatures depends upon the different degrees of power with which they retain the heat necessary to fluidity. Liquids may be considered as solids in combination with heat, which exists in them as latent heat, and which they give out as sensible heat when they return to the solid form.

Freezing mixtures are such as produce cold by and during the liquefaction of their solid ingredient, and the consequent absorption of the heat on which its solid form depended; such mixtures reduce the temperature of substances immersed in them on the principle of the transfer of heat, which always takes place from hotter to colder bodies when exposed to each other.

The process used by confectioners for producing cold is by the mixture of ice and common salt, which both liquefying absorb so much heat, or in other words produce as much cold as will reduce the thermometer from the usual temperature to zero of Fahrenheit, or even rather below it. If however freshly fallen snow be used instead of ice, then the fluidity is more suddenly produced and the cold is more intense.

Mr. Walker, of Oxford, published in the 'Philosophical Transactions' for 1801 an account of various frigorific mixtures for producing intense cold. The following table contains the results which he obtained by using the annexed proportions of snow and different salts and acids:—

	Parts by weight.		Thermometer sinks
Common salt	1	From any temperature	
Snow	2		to — 5°
Common salt	2		
Muriate of ammonia	1		
Snow	5		to — 12°
Common salt	10		
Muriate of ammonia	5		
Nitrate of potash	5		
Snow	24		to — 18°
Common salt	5		
Nitrate of ammonia	5		
Snow	12		to — 28°

It will however be observed that by using the snow with a fluid dilute acid, and by the consequent more rapid solution, the degrees of cold produced are much more intense than when a solid salt is employed with snow.

It is found that ice or snow, though exceedingly convenient substances for the production of artificial cold, are by no means necessary to it. By referring to Mr. Walker's paper already quoted, it will be found that any salts which dissolve rapidly in water, and when very finely powdered in order to increase that effect, are powerful freezing mixtures. Mixtures of muriate of ammonia and nitrate of potash, and of these with phosphate of soda, act strongly in this way; and so do various other salts: thus 9 parts of phosphate of soda, 6 of nitrate of ammonia, and 4 of diluted nitric acid, reduced the thermometer from + 50 to − 21° or 71°; 5 parts of sulphate of soda and 4 of diluted sulphuric acid from + 50° to + 3°; and nitrate of ammonia by solution in an equal weight of water merely reduced the thermometer from 54° to + 4° or 46°. By using a mixture of snow and chloride of calcium the writer of this article assisted many years ago in an experiment by which 50 pounds of mercury were rendered perfectly solid.

	Parts by weight.	Thermometer sinks.	Degrees of cold produced.
Diluted sulphuric acid, ⅓ water	2		
Snow	3	+ 32° to − 23°	55°
Concentrated muriatic acid	5		
Snow	8	+ 32° to − 27°	59°
Concentrated nitrous acid	4		
Snow	7	+ 32° to − 30°	62°
Chloride of calcium crystald.	5		
Snow	4	+ 32° to − 40°	72°
Crystald. chloride of calcium	3		
Snow	2	+ 32° to − 50°	82°
Fused potash	4		
Snow	3	+ 32° to − 51°	83°
Diluted sulphuric acid	10		
Snow	8	− 68° to − 91°	21°

The 3rd and 4th vols. of the *Philosophical Magazine and Annals of Philosophy* for 1828 contain two communications from Mr. Walker, about 40 years after the appearance of his first paper in the *Philosophical Transactions;* the papers in the 'Philosophical Magazine' contain a description of very useful apparatus for experiments with frigorific mixtures.

Leslie's apparatus for freezing will be considered under HEAT.

FREEZING AND MELTING POINTS. The following table, taken principally from Dr. Ure, will show the freezing and melting points of several liquids and solids; that is, the degrees of Fahrenheit's thermometer at which the former solidify and the latter liquefy. The solidifying

temperature of the bodies above tallow is usually called their *freezing or congealing point;* and of tallow and the bodies below it, the *fusing or melting point.* There are added the fusing points of some metals, as determined by Professor Daniell, by means of his register pyrometer (*Phil. Trans.*, 1830.):—

Substance			Degrees
Sulphuric æther			− 46°
Liquid ammonia			− 46
Nitric acid	spec. grav.	1·424	− 45·5
Sulphuric acid	do.	1·611	− 45
Mercury			− 39
Nitric acid	spec. grav.	1·407	− 30·1
Sulphuric acid	do.	1·8064	− 25
Nitric acid	do.	1·3880	− 18·1
Ditto	do.	1·2583	− 17·7
Ditto	do.	1·3290	− 2·4
Brandy			− 7
Sulphuric acid	spec. grav.	1·8376	+ 1
Pure hydrocyanic acid			4 to 5
Common salt	25 + 75	water	4
Ditto	22·2 + 77·8	do.	7·2
Sal ammoniac	20 + 80	do.	8
Common salt	20 + 80	do.	9·5
Ditto	16·1 + 83·9	do.	13·5
Oil of turpentine			14
Strong wines			20
Rochelle salt	50 + 50	water	21
Common salt	10 + 90	do.	21·5
Oil of bergamot			23
Blood			25
Common salt	6·25 + 93·75	water	25·5
Epsom salt	41·6 + 53·4	do.	25·5
Nitre	12·5 + 87·8	do.	26
Common salt	4·16 + 95·84	do.	27·5
Copperas	41·6 + 58·4	do.	28
Vinegar			28
Sulphate of zinc	53·3 + 46·7	water	28·6
Milk			30
Water			32
Olive oil			36
Sulphur and Phosphorus, equal parts			40
Sulphuric acid	spec. grav.	1·741	42
Ditto	do.	1·780	46
Oil of anise			50
Concentrated acetic acid			50
Tallow (Dr. Thomson)			92
Phosphorus			108
Stearin, from hog's lard			109
Spermaceti			112
Tallow (Nicholson)			127
Margaric acid			134
Potassium			136
Yellow wax			142 to 149
White wax			156
Sodium			190
Sulphur (Dr. Thomson)			218
Sulphur (Dr. Hope)			234
Tin (Crichton)			442
Cadmium (Stromeyer)			about 442
Bismuth (Crichton)			497
Lead (Crichton)			612
Zinc (Daniell)			773
Antimony			809?
Silver	(Daniell)		1873
Copper	(Daniell)		1996
Gold	(Daniell)		2016
Iron, cast	(Daniell)		2786

FREIBERG is situated on the Münzbach, which flows into the Mulde, a mile and a quarter lower down: the market-place being 1200 and the Mining Academy 1231 feet above the level of the sea. It lies among the northern declivities of the Saxon ore-mountains, in 50° 55′ N. lat. and 12° 21′ E. long.; about 25 miles south-west of Dresden. Freiberg is the capital of the Erzgebirge, or ore-mountains circle in Saxony, and is the centre of administration for the Saxon mines. It is surrounded by walls; the streets are regular, well-built, and paved; and it has a suburb, besides the Freudenstein or Freistein, an old castle, now used as a storehouse for mining produce. It contains about 1300 houses, with many handsome buildings among them, and a population of about 12,900. In 1801 it was 8,737; but in 1540 nearly 40,000. There are six churches, to which a Roman Catholic church was added in 1831; and of these the High-church (once a cathedral) is a fine specimen of the architecture of the middle ages, and has a portal, called the golden door, in the true Byzantine style, a handsome stone chancel, and one of Silbermann's largest and finest organs. There is a chapel in this church in which the bodies of several Saxon dukes and electors, who were of the Protestant faith, from Henry the Pious, who died in 1541, to John George IV., who died in 1694, are interred. The High-church contains a handsome monument in memory of the brave prince Maurice of Saxony, who fell in the battle of Sievershausen in 1553, from the chisel of Cornelius Florus of Antwerp, and another to the memory of Werner, who died in 1817. There are other buildings of note in the town, among which are the town-hall, and the high school, in which the elector Augustus studied in his early years, and which is at present attended by nearly 500 pupils. The Mining Academy, which has attained considerable repute, is a spacious building: it was opened in 1767, and comprises class and lecture-rooms, the Wernerian museum, a bequest of its founder, which contains rich collections in mineralogy, &c., a geographical and a geognostic cabinet, a museum of models of mining machines, and philosophical and chemical apparatus, and an extensive library. Werner and A. Von Humboldt were pupils of this academy, which is conducted by seven professors and other teachers. The old corporation of mining officers, mechanics, and labourers, which had several electors among its members, had become nearly extinct towards the beginning of the present century, but was renovated with much solemnity at Easter, 1826. Freiberg has also a mining school for educating miners in general, a school for teachers, a Sunday and an infant school, several primary schools, and a number of benevolent institutions, among which are an hospital, an orphan asylum, a house of industry, and infirmaries.

The manufactures consist principally of articles in imitation of gold and silver ware, brass wares, white lead, gunpowder, iron and copper wares, linen, woollens, gold and silver lace, ribbons and tape, leather, and laces.

Freiberg was founded by Otto the rich, duke of Saxony, and was not only endowed by him with many immunities, whence he named it 'the mountain of the free,' but was fortified with walls and a ditch by him, in the year 1176. It suffered much in the Thirty Years' War, during which it underwent four sieges; and its vicinity was the theatre of the closing conflict of the Seven Years' War, on the 29th October, 1762, when the Imperialists were defeated by prince Henry of Prussia. It was the cradle of the Reformation in this part of Saxony; Protestantism having been planted here by Henry the Pious, in 1537.

About three miles out of the town are the extensive amalgamation works for this rich mining district; and near them are the machinery, which raises craft about fifty feet from the Mulde into the canal, as well as an old aqueduct, resting on stone columns, and in other respects similar to the Roman aqueducts, which runs between two hills, but is no longer in use. In the immediate neighbourhood are the large mines of Himmelsfürst, near Brand, the 'Old Hope of God,' near Voigtsberg, which lies at a depth of 60 feet below the level of the sea; Frederic Augustus's mine, near Gross-Schirma; the Beschert-Glück, and Old Elizabeth's. (ERZGEBIRGISCHE KREIS.)

FREIBURG, a town and university in the circle of the Upper Rhine, in the southern part of the grand duchy of Baden, situated on the Treisam, about 100 miles to the S.W. of Carlsruhe, stands at an elevation of about 940 feet above the level of the sea, and was formerly the capital of the Breisgau; 47° 59′ N. lat. and 7° 53′ E. long. It contains about 1350 houses, and 15,100 inhabitants, exclusive of the students, whose numbers are about 450 or 500, but inclusive of the adjoining villages of Herdern and Wiehre or Adelshausen, the inhabitants of which are burgesses of Freiburg; the population is upwards of 19,000. Twenty years ago the population was 10,208. The town has walls, with three gates, a fourth having been removed, and one suburb, called Stephanie; it is in general open and well built, the 'Kaiserstrasse' or street of the emperor in particular being broad, and lined with handsome houses. Among the public edifices we notice the former house of assembly for the states, which is at present the archbishop's palace; the grand duke's palace, on the site of the former citadel; the government buildings; the edifice containing the courts

of justice and post-office; the old and the new university buildings, the latter of which was once a college of Jesuits; the town-hall, museum, granary, theatre, and house of correction. Freiburg has several open places or squares, in the centre of one of which, the fish-market, is a fountain surmounted with a statue of Duke Berthold III., the founder of the town, represented in the habiliments of his time. Besides three Catholic churches and one Lutheran, the religious establishments have several churches and chapels attached to them. The most attractive feature in the town is the cathedral or minster, probably the most beautiful and perfect specimen of Gothic architecture in Germany. It is a work of the twelfth century, begun in 1122, and not completed until 160 years afterwards; the tower, which is 386 feet high, is peculiarly remarkable for its hardy lightness and elegance. Though not quite so lofty as St. Stephen's at Vienna, or the cathedral at Strasburg, it is deemed to excel both in purity of style, symmetry of proportions, and boldness of construction. It is built of red sandstone, in the form of a cross, and contains several windows of finely-painted glass, as well as the sarcophagi of the dukes of Zähringen, a holy supper, sculptured in stone, and paintings by Grien, Holbein, and other artists. Holbein's Ascension of the Virgin, which forms the altar-piece, is esteemed his *chef d'œuvre*.

The university, which was founded under the name of 'the Albertina' by the archduke Albert VI. of Austria, in the year 1454, enjoys endowments to the extent of upwards of 2500*l.* a-year, and is possessed of a library of more than 100,000 volumes, as well as a museum, an anatomical theatre and clinical establishment, a botanic garden, &c. It is likewise supported by an annual grant of about 3400*l.* from the States. There are also a gymnasium, with a prefect and seven teachers, a normal school, with five teachers, a civic school, many private seminaries, several Sunday and holiday schools, in which apprentices and others are taught reading, writing, arithmetic, and other branches of knowledge suitable to their vocations; a girls' Sunday-school, institutions for boarding and educating indigent girls, and a garden of industry, where the management of forests, orchards, and gardens is taught. There are a town, a university, and a military hospital, and an orphan and foundling asylum, besides an institution for the relief of the poor.

The manufactures of Freiburg consist of leather, succory, sugar, starch, tobacco, bells, musical instruments, &c.

The town was founded by Berthold III. in 1118, and the fortifications were levelled by the French, in 1754.

FREIGHT. The charge made for the carriage of merchandize in a ship, and the amount of which is generally specified in the bill of lading. [BILL OF LADING.] It frequently happens that the whole ship is hired by a merchant for the performance of the voyage, and in this case a certain amount of freight is paid without reference to the quantity of goods actually put on board, which may be sufficient to fill the ship, or any quantity short of the same. In such cases the mode of payment is part of the matter of agreement between the ship-owner and the merchant, and the instrument by which this and other stipulations are set forth is called a charter-party. Where no such instrument exists, and the shipper of goods does not stipulate for the right of using the entire portion of the ship appropriated to the reception of her cargo, the amount of the freight, as well as the mode of payment, may be inserted in the bill of lading. Where this is not done, the freight is by law considered due on the part of the merchant on the delivery of the goods, and the owner or master of the ship may, if so minded, demand payment of the same, package by package, as the same are delivered. In almost all branches of trade, however, some custom in this respect has arisen which is ordinarily pursued, and the legal rights of the ship-owner are not enforced in this respect. In London, where the greater part of the merchandise brought from foreign countries is delivered into the custody of one or other of the incorporated dock companies, a custom has arisen of arresting the goods in their hands, so that they cannot pass away from the original importer until the ship-owner, or some person acting on his behalf, has signified in writing that the freight has been paid. If goods are damaged on board the ship, through the carelessness or wilful neglect of those in whose charge she and her cargo are placed, so that the owner of the ship is held to be liable for the amount of the damage, this cannot, but with the consent of the owner or master, be set off against the amount of the freight, which must under all circumstances be paid, and the merchant must afterwards substantiate his claim to compensation for the amount of the damage.

FREINSHEIM, JOHN, was born at Ulm, in 1608, and studied at Strasburg, where he became librarian to Matthias Bernegger, a wealthy philologist, who gave him his daughter in marriage. He was afterwards appointed professor of eloquence in the university of Upsal, where he remained five years, after which he was made librarian to Queen Christina, with a handsome salary. But his health and the rigour of the climate of Sweden obliged him to return to Germany in 1655, when the elector palatine appointed him honorary professor in the university of Heidelberg, and his councillor at the same time. He died at Heidelberg in 1660. Freinsheim wrote a supplement to Livy, with the intention of replacing the lost books of that historian. The first part of this work was published at Strasburg, in 1654, and the remainder appeared in Doujas's edition of Livy ad usum Delphini. Freinsheim endeavours to imitate Livy's style, and he regularly quotes the authors from which he derived the materials for his narrative. He also wrote a Supplement to Quintus Curtius, besides a Commentary on the same writer, as well as on Florus and Tacitus. Freinsheim wrote also: 'De calido potu Dissertatio,' 'De Prœcedentia Electorum et Cardinalium,' and other learned works.

FRE'JUS, an episcopal town in France, in the department of Var, on the coast of the Mediterranean Sea, near the mouth of the river Argens, on the road from Paris by Aix and Brignolles to Antibes and Nice, 553 miles from Paris, in 43° 25′ N. lat. and 6° 45′ E. long.

Fréjus is supposed to have been originally a colony of the Phocæans of Massilia, now Marseille, but the time of its foundation is unknown. It took its Roman name, *Forum Julii*, from Julius Cæsar, who may possibly have commenced the excavation of the port which was completed in the time of Augustus, who established here the station of a fleet destined to protect the coast of Gaul; a Roman colony was fixed here, and the town became wealthy and populous. It is at present a place of small importance.

By the advance of the land (formed by the alluvium of the Argens) upon the sea, the port of Fréjus was converted into a pestilential marsh, and at a later period into dry land, half a mile from the sea. In the centre of it there is still a small étang or pool, into which a canal for irrigation, dug from the Argens, flows, and which communicates by another channel with the sea. The limits of the antient port may be traced along the whole length of the quay which surrounded it, and which yet remains, barely elevated above the marshy soil of what was once the harbour. A rude mass of masonry indicates the site of the Pharos or light-house which antiently stood at the entrance of the port. The harbour was twice as large as that of Marseille, being above 1700 feet from the entrance to the deepest recess, and about 1600 feet wide.

There are some remains of the antient ramparts, which appear to have enclosed a site five or six times as large as that occupied by the present town. Two of the Roman gates yet remain: one called 'the gate of Cæsar,' the other 'the gilded gate,' from some gilt-headed nails found there; the latter was the gate communicating with the antient port. There are some remains of aqueducts, and the ruins of an amphitheatre, faced with little squared stones and bricks: this amphitheatre is considerably smaller than that of Nîmes. Many other remains of Roman edifices exist.

The present town is small and ill built. The population in 1831-2 was 2487 for the town, or 2665 for the commune.

The diocese of Fréjus is said to have been established in the fourth century; the bishop was and still is a suffragan of the archbishop of Aix: his diocese formerly included Lower Provence; it now comprehends the department of Var.

The name Fréjus is a corruption of Forum Julii; in the Dictionary of Expilly, published in the middle of the last century, it is called Fréjuls.

FRENCH BERRIES, or the Grains of Avignon, the berry of the *rhamnus infectorius*, which is gathered before it is ripe; it affords a pretty fine yellow, but the colour is not permanent. It may be used, according to Berthollet, by preparing the cloth in the same way as for dyeing with weld. As this berry is rich in colour, it is often substituted for weld in calico-printing, although it is inferior in quality.

FRENCH ECONOMISTS. [POLITICAL ECONOMY.]

FRERET, NICHOLAS, born at Paris, in 1688, was the son of a solicitor. He studied the law to please his family, but devoted his attention chiefly to the study of history and chronology. His first publication, 'Origine des Français et de leur Etablissement dans les Gaules,' is written with a boldness and candour unusual at that time; but it caused his confinement in the Bastille for a short time by order of the Regent d'Orleans. He was made a member of the Academy of the Inscriptions, and wrote numerous memoirs, chiefly upon difficult questions of antient history and chronology. His principal works are: 'Recherches Historiques sur les anciens Peuples de l'Asie;' 'Observations sur la Généalogie de Pythagore;' 'Observations sur la Cyropédie de Xénophon;' 'Défense de la Chronologie fondée sur les Monumens de l'Histoire ancienne, contre le Système chronologique de Newton.' This last work was edited after Freret's death by Bougainville, who added to it a biographical notice of the author. Freret, while discarding the enormous antiquity attributed by some to Egyptian and Chinese history, and showing the accordance of the authentic records of those nations with the Mosaic chronology, throws back the dawn of the historical times of Greece several centuries further than Newton. He wrote also on the religion and geography of the antients. Freret was a man of very extensive erudition and of indefatigable application, and he rendered considerable service to history. He died at Paris in 1749. His scattered works have been published together: 'Œuvres complètes de Freret,' 20 vols. 12mo, Paris, 1796. Long after Freret's death, two or three works of an anti-Christian tendency were published under his name by Naigeon, a disciple of Diderot, and others of the same school; but these works are so different in their style and spirit from all those that are known to be his, and their authenticity has been so little proved, that they are generally regarded as apocryphal. This question is discussed at length in the *Biographie Universelle*, art. *Freret*. Other compilations, and the old Encyclopédie among the rest, have freely attributed to Freret the works above alluded to.

FRERON, ELIE CATHERINE, was born in 1719, and educated by the Jesuits. He made himself conspicuous by his literary journal, which he began to edit in 1746, under the title of 'Lettres à Madame la Comtesse.' Being suppressed on account of some bitter attacks on several writers, Freron changed its title, in 1749, into that of 'Lettres écrites sur quelques sujets de ce temps' In 1754 he again changed the name of his journal to that of 'Année littéraire,' which he continued till his death in 1774. Freron directed his attacks against the philosophers of the eighteenth century, and particularly against Voltaire. His bitter invectives were more than retaliated by his adversaries, who succeeded in making Freron's name synonymous with that of a scurrilous reviewer. Freron's son (Louis Stanislas), who continued the 'Année littéraire' till 1790, became notorious during the French revolution as a violent Jacobin. He died in 1802, at St. Domingo, where he accompanied General Leclerc, being nominated sous-préfet of that island.

FRESCO, an Italian word signifying *fresh*, is employed to denote a particular manner of painting upon a ground of plaster, or the like compound, because it is usual to lay on the colours while the ground is still wet and fresh. If the picture be retouched after it is dry, it is liable to change, to be uneven in the tints, or to suffer other injuries. No more ground is therefore prepared at a time than the painter can cover in a day. The colours used are chiefly earths. The picture is generally designed on cartoons (so called from *cartone*, the augmentative of *carta*, the Italian for paper), and traced upon the soft plaster with a hard point. Nevertheless, with every aid, it requires the firm bold hand, the correct eye, and the consummate judgment of a master, to execute a picture thus in detached pieces; and to finish each part at one painting, so as to commit no error, and preserve the harmony of the whole.

A similar style of painting was known to the antients, but Winckelmann observes that they did not trace off the outline with a hard point, and that they painted, 'for the greater part,' upon the ground dry. Fresco was in use at the period of the revival of the arts in Italy; and it improved with the progress of painting, until it attained its perfection in the time of the great masters of the Roman and Florentine schools. Most of the finest works of Raphael and Michel Angelo are painted in fresco, and are at Rome. With the decline of the art, fresco painting fell gradually into disuse.

To expect great softness, delicacy, or finish from such materials, would be obviously absurd; richness and depth of colour are equally impossible. But the very want of the inferior beauties obliges the painter to rely upon the highest—composition, drawing, and expression; and the absence of that transparent lustre which belongs to oils allows of the point of view to be taken at any angle without a glare of reflected light, and displays every part of the design with the utmost distinctness and force. Fresco is however susceptible of great brightness and purity of colour. The great size which it admits of, and even demands, requires courage, skill, and power to conceive and execute. It is therefore the triumph of the great painter, but an exposure for the poor one. Michel Angelo held oil painting as fit only for 'women and children,' in comparison with fresco painting. The works of Raphael alone, who had the larger intellect, afford abundant examples to disprove this arrogant saying; for indeed genius, as Michel Angelo himself showed, when he handled the chalks and a scrap of paper, is independent of materials. Yet fresco is undoubtedly, in the words of the earnest Vasari, 'truly the most virile, most sure, most resolute, and durable of all other modes,' and thus the best fitted for the purposes of history painting in its most exalted form.

FRESCOBALDI, GIROLAMO, a most distinguished composer for and performer on the organ, was a native of Ferrara, and at the age of twenty-three became organist of St. Peter's at Rome. He may be considered as the father of the true organ style, and his writings have been more or less imitated by every orthodox composer of the kind of music in which he so much excelled. 'His first work,' says Dr. Burney, 'entitled *Ricercari e Canzoni Francese, fatte sopra diversi oblighi in Partitura*, contains the first compositions we have seen printed in score, and with bars. They are likewise the first regular fugues that we have found upon one subject, or of two subjects carried on at the same time, from the beginning of a movement to the end.' Sir J. Hawkins unhesitatingly tells us that Frescobaldi was born in 1601, and this date may be correct, if what Gerber states be accurate, namely, that his first work was published in 1628. But Dr. Burney, with apparent confidence, dates the work 1615, in which year it is highly improbable that compositions of so elaborate a nature should have been published by the author, had his age then been only fifteen. However, in 1641, according to Della Valle, Frescobaldi was living.

FRESNOY, CHARLES ALPHONSE DU, was born at Paris, in 1611. His father, who was an apothecary, gave him a classical education, with a view to bringing him up as a physician. But an inclination for painting induced the son to act in opposition to the wishes of his friends, and he devoted himself to the study of the art, firstly under Perier, and afterwards with Vouët. At the age of one-and-twenty he went to Rome, where he supported himself with difficulty by taking views of ruins and buildings. Subsequently he was joined by his fellow-student, Mignard, whose assistance bettered his circumstances. The two were employed to copy pictures in the Farnese gallery. Du Fresnoy afterwards visited Venice. He returned to France in 1656, whither he was followed by Mignard in 1662, and they again lodged together. He died paralytic in 1665, in the house of his brother, at Villiers-le-bel, near Paris. He was never married, and left no pupils. He executed very few pictures, and they are not remarkable for anything beyond correctness. He is best known as the author of a didactic poem, 'De Arte Graphica,' in Latin verse, which has been translated into several languages. There are three English translations: by Dryden, in prose; by Wills, a painter, in very poor verse; and by Mason, in rhyme. The last is accompanied by annotations written by Sir J[illegible]hua Reynolds. The work is rather a critical treatise on the practice of painting, with general advice to the student, than a manual for the art. It is dry, and not remarkable for elegance, imagination, or originality. Had it been in prose, it would probably not have survived the author; but the circumstance of its being in verse, and in Latin, perhaps added a zest to its perusal in the shape of a little difficulty, and gave it an extrinsic importance. Sir Joshua's notes are pertinent and useful, but not so instructive as his lectures. The work will not suffice in the

smallest degree to teach the theory or the practice of painting, but it repeats some useful precepts, which cannot be too much insisted on. (Mason; *Biographie Universelle.*)

FRET, in musical instruments of the stringed kind, is a wire fixed round the neck, for the purpose of marking the exact part of the finger-board to be pressed for the purpose of producing certain sounds. Frets are now never applied to any instruments except guitars, lutes, &c.

FREYBURG. [FREIBURG.]

FREYBURG or Fribourg, the Canton of, one of the cantons of the Swiss Confederation, is bounded on the north and east by the canton of Bern, south by the canton of Vaud, and west by the canton of Vaud and the lake of Neuchâtel, which divides it from the canton of Neuchâtel. Its length from north to south is 40 miles; its breadth, which is very unequal, is about 28 miles in the widest part; its area is reckoned at 26¾ German, or 588 English square miles; and its population in 1834 was 89,192, including resident strangers. The south part of the canton is very mountainous, being covered by offsets from the great Alpine chain which divides the waters that fall into the Rhône and the lake of Geneva from those which flow into the Aar. The canton of Freyburg belongs to the basin of the latter river, being watered in its length from south to north by the Sarine or Saane, one of the principal affluents of the Aar; the general slope of the ground is towards the north and north-west, down to the plains which border the lakes of Morat and Neuchâtel. There is but a very small fraction of the south-west part of the canton which slopes southwards towards the lake of Geneva along the course of the stream of Vevayse. The highest summits in the south part of the canton, and on the left bank of the Sarine, are the Moléson, 6000 feet, and the Dent de Jaman on the borders of Vaud, which is 4500. On the right or east bank of the Sarine the highest, the Dent de Brenleire, is above 7000 feet, and la Berra is about 5300 feet. Besides the Sarine and its affluents, which drain more than two-thirds of the territory of Freyburg, the Broye, which has its source on the borders of Vaud, runs northwards, crossing the western part of the canton, enters the lake of Morat, and issuing from it at the opposite end, empties itself into the lake of Neuchâtel.

The climate is cold in winter and subject to sudden changes of temperature in the spring and autumn. The principal productions of the soil are wheat, rye, barley, and oats; good pasture, both natural and artificial, some vines and other fruit trees, especially in the lowlands near the lakes of the Morat and Neuchâtel, tobacco plantations, and timber or forest trees. In common years the canton produces sufficient corn for its own consumption. Potatoes are also cultivated. In 1834 the number of cattle was as follows:—43,339 heads of black cattle; 21,150 sheep; 6352 goats; 20,158 pigs; 11,140 horses; with a few asses and mules. The consumption of butcher's meat throughout the canton during the same year was 5?7 bullocks, 4613 cows, 5971 calves, 7686 sheep, 913 goats, and 11,034 pigs. The cheeses made in the canton of Freyburg are among the best in Switzerland. The cheese called Gruyère is made in an Alpine district on the left bank of the Sarine, in the south part of the canton. It is estimated that about 40,000 cwt. of cheese is made yearly, which is worth about 75,000*l.* sterling.

The manufactories, which are not very considerable, consist of straw-platting, tanning of leather, distilleries of kirschwasser, tobacco-manufactories, iron-works, glass-works, and paper-mills. Coals are dug at Weibelsried, in the valley of Bellegarde, on the right bank of the Sarine, and are sold at Freyburg for about 3*s.* 6*d.* the hundredweight; an inferior sort is found at Semsale, on the left bank, which sells for half the price. Turf is cut in the marshes of Morat and elsewhere.

The game consists of hares, chamois, red partridges, woodcocks, wild ducks, &c. Wolves and bears have become very rare, and stags and boars are extinct. The rivers and lakes abound with trout, carp, pike, tench, and eels.

The natives of the canton are generally robust and well made, especially in the highlands; they are sociable, intelligent, simple in their manners, docile, and inclined to superstition. The Roman Catholic is the only religion of the canton, with the exception of the district of Morat, which contains 8400 inhabitants who are protestants of the Helvetic church. There are also some protestants in the town of Freyburg, who obtained in 1835 permission to have a chapel and a school. The Catholic secular clergy consists of 250 members. There are besides about 200 monks and 280 nuns, possessing a capital of about 100,000*l.* sterling. Popular education has been greatly neglected till lately; there are now 213 elementary schools, which in 1834 were attended by 11,000 children of both sexes. A school for teachers has been also established. There is a college at Freyburg under the direction of the Jesuits, attended by about 500 students, a boarding-school also kept by the Jesuits, a grammar-school also at Freyburg, founded in 1835, a Protestant college at Morat, and several institutions for girls in various parts of the canton. Over the greater part of the canton several French, or rather Romance dialects are spoken, but the educated people speak real French; in the northern and eastern districts, which approach Bern, a Swiss German dialect is spoken. The territory composing the canton of Freyburg, together with the neighbouring parts of Bern, was known in the middle ages by the name of Œdland, Uechtland, and Desertum Helvetiorum, the country having been utterly desolated by the irruptions of the Alemanni and other barbarous hordes, after the fall of the Western empire. It formed part of the kingdom of Burgundy till the 11th century; it was afterwards governed as a fief of the empire by the hereditary dukes of Zähringen, who were the benefactors of the country: they built towns, among others Freyburg 'free town,' to which they gave a municipal government, independent of the neighbouring petty feudal lords. After the extinction of the House of Zähringen, Freyburg passed under the House of Kyburg, and from this into that of Habsburg. Rudolph of Habsburg, the founder of the Austrian dynasty, confirmed and increased the municipal liberties of Freyburg in 1274. At that time the territory of Freyburg extended only about 8 miles round the town, and is still known by the name of 'alte landschaft,' 'the old country.' In 1450 the Duke Albert of Austria, styled the prodigal, being unable to give assistance to Freyburg, which was assailed by Bern and the other Swiss cantons, released the citizens from their oath of allegiance, and left them to shift for themselves, after having plundered them of all their silver and plate. Freyburg then remained for some years under the protection of the Dukes of Savoy. In the war of Burgundy it took the part of the Swiss against Charles the Bold, in recompense for which it was received into the confederacy as a sovereign canton or state in 1481. By that and the subsequent wars, Freyburg increased its territory to its present extent, at the expense of the neighbouring lords and of the dukes of Savoy.

The government, which was originally a popular muncipality like that of Bern, all the burghers having the elective franchise, became, as the town increased its territory, aristocratic towards its new subjects, and even in the town of Freyburg and its old territory the Great Council or legislature came to be a self-renewing body, the seats in which were monopolized by a limited number of patrician families exclusively. It was in reality the most close and narrow oligarchy of all Switzerland. After the political changes of 1798—1815, a fourth part of the seats in the Great Council was given to the country members, the rest remaining in the possession of the patricians. In December, 1830, the country people, joined by many of the citizens, loudly demanded a total change in the government, and after some demur the Great Council complied; a new constitution was framed, by which all bourgeois, of either town or country, having the freedom of a commune, aged 25, and who are neither servants nor in the service of a foreign state, have the right of voting in the primary assemblies, which assemblies choose the electors in the proportion of one for every 100 souls. The electors assemble in the head town of their respective districts, forming what is called the electoral colleges, which elect the members to the Great Council or Supreme Legislature, in the proportion of one for every 1000 souls. The members are appointed for nine years. The Great Council holds two ordinary sessions every year, in May and November. It appoints the council of state, or executive, composed of 13 members for eight years, and the court of appeal of 13 judges for life. The Avoyer is president of the council of state and is elected by its members for two years. The canton is divided for administrative purposes into 13 districts.

Morat, the head town of one of the districts, situated on the right bank of the lake of the same name, has about 1600 inhabitants, carries on a considerable trade, has a college, a public library, a subscription library, an hospital, an orphan asylum, and a castle, built in the 13th century. Near it is

a pyramid raised in 1822, in commemoration of the battle against Charles of Burgundy, the old chapel and ossuary having been destroyed by the French in 1798.

The lake of Morat, in German Murtensee, is about five miles long and two broad, and about 160 feet in its greatest depth; it abounds with fish. It is subject to floods, at which times it overflows the neighbouring plains, which are mostly towards the north, in the direction of the lake of Bienne.

Every district has a prefect, appointed by the council of state for six years, and a court of première instance. The communal administration varies greatly according to the temper and instruction of the respective populations. Several of the communes have divided their communal lands, have established common dairies, have formed savings' banks, in order to get rid of the scourge of pauperism, but others still continue in their careless mode of administration, wasteful of their communal lands and forests, and are encumbered with beggars. A few have taxed themselves for the support of their poor. The 'heimathlosen,' or men without a settlement, who amount to 390 families, and strangers, called 'habitans,' who pay a slight yearly tax, have no share in municipal offices. By a law of 26th May, 1834, natural children have been admitted to the same political rights as legitimate ones. The roads, which were proverbially bad in this canton, begin to improve; in 1834, the Great Council voted a loan of 600,000 francs, 24,000*l.* sterling, for this object. A new civil code has been compiled, and the obligatory registry of mortgages has been established. A commission has been appointed for the revision of the penal laws, which were barbarous, as in most other cantons in Switzerland. Torture has been abolished. In the year 1834, the list of crimes which came before the court of appeal was as follows: forty-one thefts or robberies; eleven assaults and battery; two forgeries; two frauds, and one dereliction of an infant. In the same year the number of births was 2825, of which 138 were illegitimate.

The revenues of the canton are derived from the dîmes or tithes on land, from the feudal rights and dues with which many properties are still encumbered, and which are collected by the state, though by a law of 1833 the proprietors have the power of redeeming themselves; from the forests belonging to the state, from the interest of capital, from customs and other indirect taxes, from fines, and from the mint, post-office, and other rights called regalia. The whole of the revenues in 1834 amounted to 412,386 Swiss francs (a Swiss franc is equal to 1½ French francs), and was nearly all absorbed by the expenditure, of which the principal items were: general administration, 56,640 francs; department of justice, 47,780; military, 47,917; general police, gendarmerie, prisons, &c., 68,969; bridges and highways, 95,947; public instruction, 6277; miscellaneous expenses, 83,000.

The militia of the canton consists of 2565 men, of whom some companies perform duty by turns, and all must be in readiness to march when called out. There is besides, the landwehr, consisting of all the men capable of bearing arms in case of necessity.

The French is now adopted as the language of the government but all laws, decrees, and resolutions, must be published both in French and German. The press is free, but subject to laws against abuses of it.

There are about 100 holidays kept in the year, including Sundays; dancing, a favourite diversion of the people, was formerly allowed only on certain days, but now a greater freedom is allowed.

(Lereseche, *Dictionnaire Géographique Statistique de la Suisse*, 1836; *Gemälde der Schweiz, der Canton Freiburg*, St. Gall, 1835; Dandolo, *Svizzera Occidentale, Cantone di Friburgo.*)

FREYBURG, Fribourg in French, the capital of the canton, is built on several steep hills on both banks of the river Sarine, and its appearance is extremely bold and picturesque. Part of the houses rise along the slope of the hills, others are supported by massive substructions and buttresses, and separated from each other by deep ravines. Naked rocks, gardens, trees, and green fields are seen intermixed with churches, convents, and other buildings, the whole being surrounded by ramparts flanked with towers. Four bridges join the two banks of the Sarine, one of which, an iron suspension-bridge, erected in 1834, is one of the finest in the world; its length is 885 feet, and it stands 170 feet above the level of the river. The other remarkable structures in the town are: 1, the town-house, built in the sixteenth century, in which the great council meets; 2, the collegiate church of St. Nicholas, built in the twelfth century; 3, the college of St. Michel, kept by the Jesuits, with an establishment for boarders, in which several hundred young men, mostly foreigners, are educated; 4, the monastery of the Ursulines; (these nuns keep the female elementary schools); 5, the Lyceum, opened in 1805; annexed to which are collections of medals, mineralogy, zoology, &c.; 6, the Chancellery, in which the council of state sits, and the archives and other offices of government are kept; 7, the convent of the Franciscans, of which Father Girard, the zealous promoter of popular education, was an inmate; and several other convents and churches. The population of Freyburg, in 1834, was 8535, including about 1000 natives of other cantons of Switzerland, and 833 foreign residents. The manufactories are few: the principal are woollens, pottery, tobacco, and straw hats; there are also two printers and six booksellers. The scientific societies are the following: those of archæology, of natural sciences of medical science, and of public economy; a literary club, and a mechanics' institution. A savings' bank was established in 1829, and the deposits in 1835 amounted to 75,000 Swiss francs. A market is held every Saturday, besides five fairs in the course of the year. Freyburg lies 16 miles south-west of Bern, and 32 miles north-east of Lausanne.

FRIARS, from the French *frères*, a term in strictness meaning the brethren of a community, but more particularly applied to a new order of religious persons, who mostly sprang up at the beginning of the thirteenth century, and were encouraged in the hope of restoring respect to the monastic institution, the ample endowments of which had led it to degenerate from its primitive austerity, and yield to luxury and indulgence.

These Friars consisted of Dominicans, Franciscans, Trinitarians or Maturines, Crossed or Crutched Friars, Austin Friars, Friars of the Sac, Bethlemites, Friars of the Order of St. Anthony of Vienna, Friars de Pica, and Bonhommes or Good Men. These last were brought into England by Edmund, Earl of Cornwall, in 1283, and a colony of them was placed at Ashridge in Buckinghamshire. The Capuchins and Observants were distinctions of the Franciscan Friars.

Warton, in his 'History of English Poetry,' speaking of the Mendicants (for such they were called from their begging, being destitute of fixed possessions), says, these societies soon surpassed all the rest, not only in the purity of their lives, but in the number of their privileges, and the multitude of their members. Not to mention the success which attends all novelties, their reputation quickly arose to an amazing height. The popes, among other uncommon immunities, allowed them the liberty of travelling wherever they pleased, of conversing with persons of all ranks, of instructing the youth and the people in general, and of hearing confessions without reserve or restriction; and as on these occasions, which gave them opportunities of appearing in public and conspicuous situations, they exhibited more striking marks of gravity and sanctity than were observable in the deportment and conduct of the members of other monasteries, they were regarded with the highest esteem and veneration throughout all the countries of Europe. In the mean time, they gained still greater respect by cultivating the literature then in vogue with the greatest assiduity and success. Giannone says, that most of the theological professors in the university of Naples, newly founded in the year 1220, were chosen from the mendicants. They were the principal teachers of theology at Paris, the school where this science had received its origin. At Oxford and Cambridge, respectively, the four great orders (the Franciscans, Dominicans, Carmelites, and Augustines) had flourishing monasteries. The most learned scholars in the university of Oxford, at the close of the thirteenth century, were Franciscan friars, and long after this period the Franciscans appear to have been the sole support and ornament of that university.

The buildings of the mendicant monasteries, he adds, especially in England, were remarkably magnificent, and commonly much exceeded those of the endowed convents of the second magnitude. As these fraternities were professedly poor, and could not from their original institution receive estates, the munificence of their benefactors was employed in adorning their houses with stately refectories and churches, and for these and other purposes they did

not want address to procure multitudes of patrons, which was facilitated by the notion of their superior sanctity. It was fashionable for persons of the highest rank to bequeath their bodies to be buried in the friary churches, which were consequently filled with sumptuous shrines and superb monuments. In the noble church of the Grey Friars in London, finished in the year 1325, but long since destroyed, four queens, besides upwards of six hundred persons of quality, were buried, whose beautiful tombs remained till the Dissolution. These interments imported considerable sums of money into the mendicant societies. It is probable that they derived more benefit from casual charity than they would have gained from a regular endowment. The Franciscans indeed enjoyed from the popes the privilege of distributing indulgences, a valuable indemnification for their voluntary poverty.

On the whole, two of these mendicant institutions, the Dominicans and the Franciscans, for the space of near three centuries, appear to have governed the European church and state with an absolute and universal sway; they filled, during that period, the most eminent ecclesiastical and civil stations, taught in the universities with an authority which silenced all opposition, and maintained the disputed prerogative of the Roman pontiff against the united influence of prelates and kings, with a vigour only to be paralleled by its success. The Dominicans and Franciscans were, before the Reformation, exactly what the Jesuits have been since. They disregarded their monastic character and profession, and were employed not only in spiritual matters, but in temporal affairs of the greatest consequence; in composing the differences of princes, concluding treaties of peace, and concerting alliances; they presided in cabinet councils, levied national subsidies, influenced courts, and managed the machinery of every important operation and event, both in the religious and political world.

From what has been here said, it is natural to suppose that the mendicants at length became universally odious. The high esteem in which they were held, and the transcendent degree of authority which they had assumed, only served to render them obnoxious to the clergy of every rank, to the monasteries of other orders, and to the universities. Their ambition was unbounded, and their arrogance intolerable. Their increasing numbers became, in many states, an enormous and unwieldy burthen to the commonwealth. They had abused the powers and privileges which had been entrusted to them, and the common sense of mankind could no longer be blinded or deluded by the palpable frauds and artifices which these rapacious zealots so notoriously practised for enriching their convents. The esteem for them degenerated greatly on the Continent. In England, at the dissolution of religious houses, they fell as unpitied as the rest of the monasteries.

(Warton's *History of English Poetry*, 4to. edit. vol. i. pp. 289, 293; Tanner's *Notitia Monastica*, edit. Nasm. pref. pp. xiii. xiv.)

FRICTION. If the surfaces of two solid bodies in contact be conceived to be perfectly smooth or geometrical surfaces, and to be subject to the action of any external forces, the determination of the circumstances both of their equilibrium and motion requires that we take into consideration their mutual reactions, as a moving force, acting in the opposite directions of the common normal, at the point or points of contact. This force is strictly proportional to the pressure mutually exercised, which in the case of equilibrium is the resultant of the external forces applied, and to or from which in curvilinear motions we must add or subtract the pressure arising from centrifugal force.

But as all natural surfaces have certain degrees of roughness arising from the innumerable small asperities with which they are covered, it becomes necessary to attend to the force of *friction* acting in the tangent plane of the surfaces in a direction opposite to that in which the surfaces move or tend to move. Friction is therefore a retarding force capable of destroying but incapable of generating motion; giving a greater extent to the limits of equilibrium, and capable of acting powerfully as a mechanical force, of which the tendency is to bestow stability. It is therefore of great importance in the useful arts of life to be acquainted with its laws, to know how to increase it, as in the construction of arches, and how to diminish it, as in the machinery of clocks, and in all works in which it is an object to economise the expense of force.

The attempt to discover the laws of friction from abstract considerations on the constitution of bodies has not led, nor could have been expected to lead, to trust-worthy results. This research belongs properly to the province of experiment. The objects are within our reach, and the proper modes of experimentalizing are sufficiently obvious. But the great variety of solids of different physical properties would lead us to anticipate a corresponding variety of results; it is therefore necessary to aim at properties connected with causes independent of the constitution of the substances; in fact, to know how far friction may be influenced by the time or duration of contact, by the actual pressure of the surfaces, by the extent of the surfaces in contact, and by the velocity of the motion.

These questions were answered in a very contradictory manner by Amontons, Euler, Muschenbroëk, Desaguliers, &c.; the reason for which disagreement was, that abstract notions and hypotheses took, wholly or partly, the place of experiment, and the little of experiment which was admitted was very indifferently executed.

The importance and uncertainty of the subject at length attracted the notice of the French Academy of Sciences, and Coulomb published, in 1781, the results of an extensive series of experiments (in the 'Mémoires des Savans Etrangers') which were commenced in 1779. The high character of Coulomb as a sagacious experimentalist has preserved this memoir in great repute to the present time, and some of the laws which he inferred have been gradually confirmed, while others have been modified or rejected.

Professor Vince, of Cambridge, a few years after the publication of Coulomb's memoir, made several experiments as to the uniformity of the retarding power of friction, and affirmed that when cloth and woollen are employed, an increase of retardation accompanies an increase of velocity. To Mr. Southern are due some experiments of a similar nature, but the machinery was not sufficiently simple to secure certainty to his conclusions. Several able experimentalists, as Wood, Tredgold, Rennie, Morin, &c., have continued the same class of valuable researches up to the present date; and though the results on the quantity of friction compared with the pressure still exhibit great discrepancies, some few laws of friction may be regarded as being nearly if not altogether established. The subject still offers a vast field of research.

The following appear to be the most general results which have been yet obtained by observations on friction:—

1. Friction is increased by time; thus it requires the application of a greater force to move a weight along a horizontal plane from its position of rest than to keep it afterwards moving on the same plane.

This law renders one of the methods of estimating friction rather uncertain. The method alluded to consists in placing the weight on a plane of which the position at first is horizontal, and gradually elevating one extremity of the plane to an inclination sufficient to cause the imposed weight to glide down the plane; this angle accurately observed determines the ratio of the friction to the pressure; but during the operation, before the weight commences to move, its asperities become more deeply involved between those of the plane than when first placed on or when in motion; and it has been observed that by giving a light tap to the plane, the small vibrations produced are sufficient to free the weight from the acquired hold of the plane, when it would descend at a much lower inclination corresponding to its true index of friction. In other methods for attaining the same object, the distinction of the true friction, and that which only exists at the commencement of the motion, has not been sufficiently attended to, and must therefore have vitiated the results: this uncertainty is not removed even in the experiments of Mr. Rennie afterwards noticed.

2. Between substances of the same nature the friction is proportional to the pressure; thus, if a block of oak be of double the weight of another, and both, having equal surfaces of contact, are placed on one plane of uniform nature, the force necessary to move the first will be double of that requisite for the second.

3. The amount of friction is independent for one and the same body of the extent of the surface of contact.

In verifying this law it will be necessary to take care that the arrangement of the fibres may be similar in the different trials which are mutually compared; for when a rectangular block of oak is placed on an oak table so that

the fibres in both lie parallel, the friction is greater than in the case where the fibres of the block lie transversely to those of the table.

4. The friction is independent of the velocity, at least when the velocity is neither very small nor very great.

By this law it follows that friction is a constant retarding force, and consequently when a body is drawn on a plane by the action of gravity, or by the intervention of a pulley and cord, which causes it to communicate with a vertically descending weight, the spaces it passes over will be proportional to the square of the time measured from the origin of its motion.

There are other modifications of friction besides that of simple attrition, which belong to various heads, as Rigidity of Ropes, &c. We shall now give some account of the most recent and carefully conducted experiments which have been published on this subject.

In the 'Philosophical Transactions' for 1829, Mr. George Rennie published his experiments on the friction of attrition relative to several solid substances, such as ice, from its resistance to sledges, &c.

Cloth, because of its anomalous properties compared with other solids.

Leather, of so much use in the pistons of pumps, &c.

Wood, in its application to pile-driving, carpentry, &c.

Stones, from their importance in arches and other constructions.

And metals, from their extensive application to machinery, carriages, rail-roads, &c.

We must refer to the memoir itself for the tabulated results of experiments, and the author's valuable remarks thereon; and we shall only extract some of the experiments on wood and metals, as they are of the most extensive employment in machinery. Without undervaluing the experiments by the inclined plane, we decidedly prefer those referring to traction on a horizontal plane, which is to be understood in the following tables.

Friction of Woods two inches square.

Red teak on red teak.					Black beech on black beech.					Norway oak on Norway oak.				
Weight on surface.	Weight required to move it.		Proportion.	Average.	Weight on surface.	Weight required to move it.		Proportion.	Average.	Weight on surface.	Weight required to move it.		Proportion.	Average.
cwt.	lbs.	oz.			cwt.	lbs.	oz.			cwt	lbs.	oz.		
½	6	14	8·14		½	8	6	6·68		½	8	3	6·83	
1	14	2	7·92		1	15	5	7·31		1	14	5	7·82	
2	23	3	9·66		2	28	0	8		2	26	4	8·53	
3	38	1	8·82		3	45	3	7 43		3	41	3	8·17	
4	52	3	8·58		4	69	7	6·45		4	56	7	7·93	
5	64	2	8·73		5	83	3	6 73	7·13	5	67	3	8·33	7·67
6	71	12	9·36	8·82	6	100	4	6·70		6	80	4	8·37	
7	84	3	9·31		7	115	11	6·77		7	102	0	7·68	
8	90	8	9·90		8	124	10	7·18		8	164	3	5·45	
9	120	11	8·35		9	132	3	7·62						
10	126	5	8·86		10	148	11	7·53						
11	141	15	8·67											
12	154	3	8·71											
13	170	10	8·53											

Comparative Amount of the Friction of different Metals under an average Pressure of from 54·25 lbs. *to* 69·55 lbs.

Names of metals.	Average weight.	Proportion.	Weight per square inch.	
	lbs.		lbs.	oz.
Brass on wrought iron . . .	69·55	7·312	11	12·4
Steel upon steel	69·55	6·860	11	12·5
Brass upon cast iron . . .	54·25	6·745	8	0.5
Brass upon steel	69·55	6·592	11	12·5
Hard brass upon cast iron . .	54·25	6·581	6	15·9
Wrought iron upon wrought iron .	69·55	6·561	11	12·5
Cast iron upon cast iron . .	54·25	6·475	8	0·5
Cast iron upon steel	69·55	6·393	11	12·5
Cast iron upon wrought iron . .	69·55	6·023	11	12·5
Brass upon brass	69·55	5·764	11	12·5
Tin upon tin	69·55	3·305	11	12·5

The preceding table is a little abridged.

From hence it would appear that hard metals have less friction than soft ones, and that the friction of hard against hard may be generally estimated at about one-sixth of the pressure.

From his experiments on the friction of axles without unguents, Mr. Rennie remarks that when gun-metal is loaded with weights varying from one to ten hundred weight, the friction varies nearly in the proportion of $\frac{1}{7.83}$ to $\frac{1}{4.16}$ of the pressure, and is scarcely affected by time; that it was increased when yellow brass, and decreased when cast-iron was tried; and still more so when black-lead was used between the three different metals.

Relative to unguents the experiments show that for gun-metal on cast-iron with oil intervening, and a weight of ten hundred weight, the friction amounted to $\frac{1}{5.83}$ of the pressure, but on diminishing the insistent weights the friction was diminished to $\frac{1}{37.33}$; cast-iron, under similar circumstances, showed less friction, which was also diminished by hog's lard when loaded.

From hence it may be inferred that the lighter the insistent weight, the finer and more fluid should be the unguents, and *vice versâ.*

His experiments on hide-leather soaked in water, compared with dry leather, show that the soaking causes the friction to be subjected much more to the influence of time and weight.

Amongst the conclusions which Mr. Rennie draws, the following are perhaps the most important.

With fibrous substances, such as cloth, &c., friction is increased by surface and time, and diminished by pressure and velocity.

With harder substances, such as woods, metals, and stones, the amount of friction is simply as the pressure, without regard to surface, time, or velocity.

Friction is greatest with soft, and least with hard substances. The diminution of friction by unguents depends on the nature of the unguents, without reference to the substances moving over them.

Subsequent to the publication of Mr. Rennie's memoir, M. Arthur Morin, captain of artillery, commenced a series of experiments on friction at Metz, in 1831, which he continued by another series in 1832; they form the subjects of two memoirs in the volume of the 'Mémoires de l'Institut' for 1833. The author's object was to repeat the experiments of Coulomb, with the view of either verifying, or correcting them. The amounts of friction which he obtains differ greatly from those given by Coulomb, who, in his opinion, must have frequently employed materials improperly prepared, and committed other oversights, whence he accounts for the errors into which he has fallen. The results of M. Morin's experiments go completely to establish the four laws of friction mentioned at the beginning of this article.

The description of the apparatus which he employed would be too long to be inserted here, but it seems very ingenious and well adapted to obtain that precision and nicety of measurement which are requisite to render observations of this nature valuable. The motions were horizontal by means of a cord and pulley, but the most curious part of the apparatus is a dynamometer, to measure the tensions of the cord by the inflexions of an elastic lamina attached to it and to the moving train; the state of which was determined by a pencil-trace on paper laid on a circular plate of copper, having a uniform rotation. He was thus enabled to compare the spaces described, whether in retarded, uniform, or accelerated motions of the train, with the time elapsed, and he confirms the conclusion that friction is a uniformly retarding force. The relations between the radii vectores of the curve described, with the corresponding angle at the centre, which is proportional to the time, enabled him in the various cases to represent by a curve with rectangular co-ordinates the relation between the space and time, the latter curve being generally a parabola; the idea of this invention, he says, was suggested to him by M. Poncelet. His results however differ in amount so greatly from those of Coulomb, and most others who have made friction the subject of experiment (though leading to, and confirming, the same general laws), that it may be permitted to doubt whether a source of error may not be somewhere concealed in the dynamometer employed.

In the following tables we give some of the more important results of his first memoir; the first referring to surfaces which have been for some time in contact; the second giving the friction during motion; and in both cases without the employment of unguents.

I. Friction of plane surfaces which have been some time in contact.

II. Friction of plane surfaces in motion.

Names of the surfaces in contact.	State of surface.	Disposition of the fibres.	Table I. Ratio of friction to pressure.	Table II. Ratio of friction to pressure.
Oak upon oak	Dry.	Parallel.	0·60 to 0·65	0 48
Do.	Do.	Perpendicular.	0·54	0·34
Do.	Wet.	Do.	0·71	0 25
Elm upon oak	Dry.	Parallel.	0 69	0·43
Do.	Do.	Perpendicular.	0·57	0·45
Ash upon oak	Do.	Parallel.	0·50	0·40
Fir upon oak	Do.	Do.	0·52	0·36
Beech upon oak	Do.	Do.	0 53	0·36
Wild pear upon oak	Do.	Do.	0·44	0·40
Service-tree on oak	Do.	Do.	0·57	
Wrought iron upon oak	Do.	Do.	0·62	0·62
Yellow copper upon oak	Do.	Do.	0·62	0·62
Black copper upon oak	Do.	Do.	0·74	0·27
Hemp cord upon oak	Do.	Do.	0 64	0·52

The substances in Table II., and their condition and disposition, are the same as in Table I.

Some of the above ratios are three times as great as those given by Coulomb. M. Morin's second memoir is more particularly directed to surfaces with unguents, or coatings; and here he coincides more nearly with Coulomb, attributing the difference to the mode in which the latter conducted his experiments, and which may possibly have permitted some of the lighter unguents to escape from the surfaces during the process. The very complete table with which he concludes his paper is far too long for insertion here: the following is an abridgment, having reference to substances which are of frequent usage, or of small friction.

Table III. Surfaces in Motion.

Names of the surfaces in contact.	State of the surfaces.	Disposition of the fibres.	Ratio of friction to pressure.
Oak upon oak	Coated with lard.	Parallel.	0·067
Do.	Oiled.	Do.	0·108
Iron upon oak	Tallow coating.	Do.	0·256
Elm on cast iron	Do.	Parallel to the direction of motion.	0 066
Yoke-elm on cast iron	Coating of hog's lard and black lead.		0·055
Tanned ox-hide on brass	With oil of olives.		0 191
Brass on brass	Do.		0·058
Cast iron on brass	With lard.		0·070

M. Morin received every facility from his government in the pursuit of these important researches, while his industry testifies that he well merited such assistance. The uncertainties and discrepancies of observations would soon disappear if other nations produced the same ardour in individuals and the same regard for the true advance of useful knowledge.

FRICTION WHEELS. [WHEELS.]

FRIDAY. [WEEK.]

FRIEDLAND. [BONAPARTE.]

FRIENDLY, or TONGA ISLANDS, are situated in the Pacific, between 18° and 23° S. lat., and 173° and 176° W. long. They consist of three separate groups, which are said to contain more than 150 islands. Fifteen of them rise to a considerable height, and 35 attain a moderate elevation. The remainder are low. The most southern group, the Tonga-tabu Islands, were discovered by Tasman in 1643. The largest of them, Tonga, is about 20 miles long and 12 miles wide, in the broadest part. It rises about 80 ft. above the sea, and its summit is a level plain. On the northern side an excellent roadstead was discovered by Cook. The central group, called the Hapai islands, is composed of a considerable number of small islands. The largest of them is Lefooga, about 8 or 9 miles long, and 4 wide. All these islands are low and very fertile. The most northern group is formed by the Vavaoo islands, which are likewise small and low, except the island of Vavaoo, which is about 36 miles in circumference; its surface is uneven, and on the northern side it rises to a considerable elevation. On its southern side is Curtis Sound or Puerto de Refugio, one of the most spacious and safest harbours in the Pacific. The most northern island belonging to this group is Amargure or Gardner island in 17° 57′ S. lat. The most southern of the Friendly Islands is Pylstaart, in 22° 26′ S. lat.

These islands are remarkable for the mildness of their climate, their fertility, and the great variety of their vegetable productions. For food, there are cultivated and planted cocoa-nut trees, bread-fruit trees, bananas, yams, sugar-cane, and sago; the Chinese paper mulberry-tree is cultivated for its inner bark, from which the clothing of the inhabitants is made. Hogs and dogs are numerous, and both are used for food. Fish is plentiful, and also different kinds of birds, as fowls, pigeons, parrots, and the tropic bird, whose beautiful feathers here, as in other islands, are used as an ornament.

Cook called these islands the Friendly Islands, because he was received by the inhabitants in a very friendly manner; but it is now well known that they intended to kill him and to seize his vessels. They are a very industrious people, and pay great attention to the cultivation of the soil. They apply themselves also to fishing, and evince much ingenuity in the manufacture of their clothing, and of their domestic utensils. They have a complete religious system, priests and festivals, and sometimes they sacrifice men, but they do not eat them. Missionaries have now for some time been established on these islands, but we are not yet acquainted with the results of their labours. The inhabitants belong to the Malayan race, and speak a language which does not materially differ from that spoken in many other islands of the Pacific. The political constitution is a despotism, supported by an hereditary aristocracy. The number of the inhabitants is estimated to amount to 200,000. (Cook's *Voyages*; Mariner's *Account of the Natives of the Tonga Islands*; Krusenstern's *Atlas de l Océan Pacifique*.)

FRIENDLY SOCIETIES. These institutions, which if founded upon correct principles and prudently conducted, are beneficial both to their members and to the community at large, are of very antient origin. Mr. Turner, in his 'History of the Anglo-Saxons,' notices them in these words: 'The guilds, or social corporations of the Anglo-Saxons, seem on the whole to have been friendly associations made for mutual aid and contribution to meet the pecuniary exigencies which were perpetually arising from burials, legal exactions, penal mulcts, and other payments or compensations.' These 'social corporations' of our ancestors differed from the friendly societies of modern times, both as regarded the quality of their members, who were not confined to the poor or working classes, and also as regarded their objects. It is now no longer necessary to establish a mutual guarantee against legal exactions and penal mulcts, and the objects of friendly societies are now limited to an insurance against the natural contingencies of sickness, infirmity and death.

Until a comparatively recent period, the principles upon which these societies should be conducted were ill understood, and as their management was confided to persons of insufficient attainments, the common result was a speedy dissolution. One friendly society exists in London, which is said to have been established in 1715; but this fact rests only upon tradition, and is unsupported by any records in possession of the body.

The earliest occasion upon which the objects contemplated by these associations can be said to have received the sanction of either branch of the English legislature was in 1773, when a bill brought into the House of Commons by Mr. Dowdeswell, and supported by Sir George Savile, Burke and others, passed that house, but was thrown out by the Lords: its object was 'the better support of poor persons in certain circumstances, by enabling parishes to grant them annuities for lives upon purchase, and under certain restrictions.' A bill with a similar object met with the like fate in 1780, having passed through the Commons, but being thrown out by the Lords. A bill introduced in 1793 by the late Mr. George Rose passed into a law, which is known by his name, and was extensively acted upon. This act recited 'that the protection and encouragement of Friendly Societies in this kingdom, for securing, by voluntary subscription of the members thereof, separate funds for the mutual relief and maintenance of the said members in sickness, old age, and infirmity, is likely to be attended with very beneficial effects, by promoting the happiness of individuals, and at the same time diminishing the public burthens.' This act authorized any number of persons to form themselves into a society of good fellowship, for the purpose of raising funds, by contributions or subscriptions, for the mutual

relief and maintenance of the members in old age, sickness, and infirmity, or for the relief of the widows and children of deceased members. A committee of members was authorised to frame regulations for the government of the society, which regulations, after being approved by the majority of the subscribers, were to be exhibited to the justices in quarter-sessions, and if not repugnant to the laws of the realm, and conformable to the true intent and meaning of the act, were to be confirmed and made binding upon the subscribers.

Among other provisions, it was allowed to impose reasonable fines upon such members as should offend against the regulations; such fines to be applied to the general benefit of the society. By this act it was declared unlawful 'to dissolve or determine any such society, so long as the intents or purposes declared by the society remain to be carried into effect, without the consent and approbation of five-sixths of the then existing members and also of all persons then receiving or entitled to receive relief from the society, on account of sickness, age, or infirmity.' Societies thus constituted were relieved from the payment of certain stamp-duties, and were empowered to proceed for the recovery of monies, or for legal redress in certain cases, by summary process, without being liable to the payment of fees to any officer of the court; and to aid them, the court was required to assign council to carry on the suit without fee or reward. An act was passed in 1795, which extended the privileges of Mr. Rose's act to other 'benevolent and charitable institutions and societies formed in this kingdom for the purpose of relieving widows, orphans, and families of the clergy and others in distressed circumstances.' Several other acts were passed between 1795 and 1817 affecting the proceedings of these societies, but not in any matter of importance. In the last-mentioned year the 'Savings' Bank Act' was passed, and under its provisions the officers of friendly societies were allowed to deposit their funds in any savings' bank, by which means they got security for their property and a higher rate of interest than they could otherwise obtain. This act has been of essential benefit to these associations. Another law, making provisions for the further protection and encouragement of friendly societies, and for preventing frauds and abuses in their management, was passed in 1819; but as this and all other acts previously passed with the same object were repealed and superseded by the act of 1829 (10 Geo. IV. c. 56), which with two acts passed in 1832 and 1834 (2 Wm. IV. c. 37, and 4 and 5 Wm. IV. c. 40), contain the law as it now stands for the regulation of friendly societies, it is unnecessary to detail here the alterations effected in 1819.

In the years 1825 and 1827, select committees were appointed by the House of Commons to consider the laws relating to friendly societies. The reports made by these committees have thrown considerable light upon the subject, and prepared the way for the enactment of 1829, already mentioned, which, with the subsequent acts of 1832 and 1834, we now proceed to analyze.

The law of 1829, in the first place, authorizes anew the establishment of societies within the United Kingdom, for raising funds for the mutual relief and maintenance of the members, and gives protection to all such societies then existing, while it affords encouragement for the formation of like associations for the mutual relief and maintenance of all and every the members thereof, their wives or children, or other relations, in sickness, infancy, advanced age, widowhood, or any other natural state or contingency whereof the occurrence is susceptible of calculation by way of average.' The members of such societies are to meet together to make such rules for the government of the same as shall not be contrary to the intent of the act nor repugnant to the laws of the realm, and to impose such reasonable fines upon the members who offend against any of such rules as may be necessary for enforcing them; and these rules, which must be passed by a majority of the members present, may be altered and amended from time to time by the same authority. But before these original or amended rules shall be confirmed by the justices of the county at the general quarter-sessions, they must have inserted in them a declaration of the purposes for which the society is established, and the uses to which its funds shall be applied, stating in what shares and proportions and under what circumstances any member of the society or other person shall be entitled to the same; and further it is required that the rules so passed 'shall be submitted, in England and Wales and Berwick-upon-Tweed, to the barrister-at-law for the time being appointed to certify the rules of savings' banks; in Scotland to the lord-advocate or any of his deputies; and in Ireland, to such barrister as may be appointed by her majesty's attorney-general in Ireland, for the purpose of ascertaining whether such rules are in conformity to law and to the provisions of this act.' The officers here mentioned are respectively to settle such rules, and make them conformable to law and to this act of parliament, giving a certificate of this regulation having been complied with. The rules so certified are then to be deposited with the clerk of the peace for the county wherein the society is formed, and by him to be laid before the justices at quarter-sessions, who are required to confirm the same, after which the rules and certificate are to be filed with the rolls of the sessions of the peace, and a certificate of such enrolment, signed by the clerk of the peace, is to be sent to the society. If the barrister or other officer above mentioned shall refuse to certify the rules offered for his approval, the society is allowed to submit the same to the court of quarter-sessions, together with the reasons assigned for refusal, when the justices may, if they see fit, confirm the rules notwithstanding the disapproval of the revising officer. Before these directions are complied with, no society is entitled to enjoy any of the privileges or advantages communicated by the act; but when the rules shall have been enrolled, and until they shall have been altered and the like confirmation shall have attended such alteration, they shall be binding upon the members of the society, and a certified copy of them shall be received in evidence in all cases. The treasurer of each society must give bond to the clerk of the peace for the county, with two sufficient sureties, for the faithful performance of his trust, and must, on the demand of the society, render his accounts and assign over the funds of the society at the demand of a meeting of the members. The property of the society is to be vested in the treasurer or trustees of the society, who may bring and defend actions, 'criminal as well as civil, in law or in equity,' concerning the property, right, or claim of the society, provided they shall be authorized to do so by the vote of a majority at a meeting of the members.

In case any person shall die intestate whose representatives shall be entitled on his account to receive any sum from the funds of the society not exceeding 20*l.*, the treasurer or trustees may pay the money to the persons entitled to receive the property of the deceased, without its being necessary to take out letters of administration.

It is not lawful to dissolve any friendly society, so long as any of the purposes declared in its rules remain to be carried into effect, 'without obtaining the votes of consent of five-sixths *in value* of the then existing members, and also the consent of all persons then receiving or then entitled to receive relief from such society; and for the purpose of ascertaining the votes of such five-sixths in value, every member shall be entitled to one vote, and an additional vote for every five years that he may have been a member, provided that no one member shall have more than five votes in the whole.'

The rules of the society are to contain a declaration whether, in the event of any dispute or difference arising between the society and any one or more of its members, the matter shall be referred to the decision of a justice of the peace or of arbitrators; if to the latter, the arbitrators must be chosen or elected in sufficient number at the first meeting of the society which shall be held after the enrolment of its rules; they must not be in any way interested in the funds of the society; and whenever the necessity for their employment shall arise, a certain number, not exceeding three, are to be chosen by ballot from among the arbitrators for the settlement of the dispute, and justices are empowered to enforce compliance with the decision of the arbitrators. If the rules of the society direct the application, in cases of disputes, to justices of the peace, any justice is empowered to summon the person against whom complaint is made, and any two justices may hear and determine the matter, their sentence or order being final and conclusive. Minors, if they act with the consent of parents or guardians, may become members of friendly societies, having authority to act for themselves on the one hand, and being held legally responsible for their acts on the other.

A statement, attested by two auditors of the funds belonging to each society, shall be made annually to its

members, every one of whom may receive a copy of the statement on payment of a sum not exceeding sixpence.

Every friendly society enrolled under this act is obliged, within three months after the end of the year 1835, and again within three months after the expiration of every five years, to transmit to the clerk of the peace for the county in which the society is situated a return of the rate of sickness and mortality, according to the experience of the society during the preceding five years, such returns to be made in a prescribed form to insure uniformity; and the clerks of the peace are directed, within one month after the periods just named, to transmit these returns to the Secretary of State, with a view to their being laid before parliament. In case the officers of any society shall neglect to transmit these returns within the time specified, the clerk of the peace shall call upon them to make the return within 21 days; and should they neglect to comply with this demand, the society shall cease to enjoy the benefits of the act, unless sufficient reason shall be assigned to the justices at the next ensuing quarter-sessions, why such returns could not be made.

The provisions and privileges of this act were extended to all such existing societies as should conform to its provisions within three years from its date, after which time all friendly societies which should not so conform were to cease to be entitled to the privileges granted to friendly societies by this or by any other act of parliament.

The act of 1832 extended to Michaelmas, 1834, the time during which existing societies might conform to the provisions of the act of 1829, and declared its privileges to extend to all societies formed for the relief of the widows, orphans, and families of clergymen, both of the established church and of dissenters.

The provisions of the act of 1834 are for the most part confined to matters of regulation which it is not necessary to notice here. The returns relating to sickness and mortality are by this act directed to be made to the barrister appointed to certify the rules of these societies, and not to the clerks of the peace, as ordered in the act of 1829.

Societies thus constituted and privileged must be acknowledged as a great improvement upon the benefit clubs, which, under various denominations, such as sick clubs and burial societies, previously existed throughout the country. The periodical meetings of these clubs were ordinarily held in public-houses, where a part of that money was spent in present enjoyment which should have gone towards a future provision against the casualties of the members. It frequently happened that these societies were got together by the landlord of the public-house in which the meetings were to be held, and that he was constituted its secretary or treasurer, keeping the funds in his own possession, or too frequently dissipating them. Where even this evil did not arise, a temptation was held out to obtain members by the smallness of the contributions, which proved in the course of years wholly inadequate to answer the demands that were then sure to arise, although the income of the society had at first, while the members continued young, been sufficient for the purpose. The mischief thus fell upon them when they had become old and infirm, and had no means of relieving themselves from it: this evil is now prevented by the compulsory adoption of tables prescribing such rates of contributions and allowances as experience has demonstrated to be sufficient and equitable.

The considerations by which benefit societies recommend themselves to the community were so well pointed out by the Committee of the House of Commons which sat in 1825, that it will be sufficient for this purpose to insert a short extract from its report.

'It has been observed that the hostility to friendly societies has been nowhere more strong and controversial than among the patrons of savings' banks. Of these institutions your Committee will only say, that they are undeniably calculated for many very useful purposes, some of which cannot possibly be secured by institutions of mutual assurance; but your Committee affirm without hesitation, as equally undeniable, that it is *by the contribution of the savings of many persons to one common fund, that the most effectual provision can be made for casualties affecting, or liable to affect, all the contributors.* This proposition, which is indeed obviously true, has been well illustrated by a writer on friendly societies, who asks whether the advocates of a separate and exclusive saving will be easily persuaded to save their annual premium, instead of insuring their houses against fire?

'Whenever there is a contingency, the cheapest way of providing against it is by uniting with others, so that each man may subject himself to a small deprivation, in order that no man may be subjected to a great loss. He upon whom the contingency does not fall does not get his money back again, nor does he get for it any visible or tangible benefit; but he obtains security against ruin, and consequent peace of mind. He upon whom the contingency does fall, gets all that those whom fortune has exempted from it have lost in hard money, and is thus enabled to sustain an event which would otherwise overwhelm him.

'The individual depositor, not the contributor to a common fund, is really the speculator. If no sickness attacks him during his years of strength and activity, and he dies before he is past labour, he is successful in his speculation; but if he fall sick at an early period, or if he live to old age, he is a great loser, for his savings, with their accumulations, will support him but a short time in sickness; or even if he retain something in old age, after having provided for his occasional illness, the annuity which he can then purchase will be very inferior indeed to that which he would have obtained if he had entitled himself to the benefit of the accumulated savings of all those who, having contributed for many years to a superannuation fund, have never reached an age to require it.'

The rules adopted by different friendly societies vary in many particulars of minor importance. The following abstract comprises most of the practical points aimed at by such institutions, and is inserted in order to afford a general idea of the principles upon which they are based.

Rule I The object of this society is to assure to persons between the ages of twenty-one and fifty-five, who may become members thereof,

1st. An allowance, not exceeding 20s. per week, during sickness, until the age of 70;

2nd. An allowance not exceeding in the whole £2 per month, from and after the ages of 55, 60, 65, or 70, as may be previously agreed on, to continue during life; and

3rd. A payment at death, not exceeding £20.

Rule II. The contributions for these assurances shall be paid monthly, and shall be regulated by the ages of the members, at the time of admission, conformably to tables inserted at the end of the rules. Each member assuring an allowance during sickness to pay an additional contribution of 2s. per annum, to entitle himself to medical attendance and medicines when needed.

Rule III. A single contribution may be paid on admission, or at any subsequent times, the amount of which is given in the tables added to these rules, which contribution shall redeem the whole of the monthly contributions which would otherwise have been payable.

Rules IV. to XI. relate to the contributions of honorary subscribers, and to the appointment and duties of officers, the times and places of meeting, and other matters of regulation.

Rule XII. provides for ascertaining, through the examination of the surgeon, the state of health of persons applying to become members; and further provides for the periodical visits of the same officer to every member while receiving an allowance in sickness, for the purpose of ascertaining the state of his health.

Rules XIII. to XVI. prescribe the duties of the clerk of the society, the stewards, auditors, and voluntary visitors, which it is needless to detail here.

Rule XVII. provides that the treasurer and clerk shall give security to the committee for the faithful performance of their duties.

Rule XVIII. directs how special meetings may be called upon any emergency.

Rule XIX. relates to the admission of members. All candidates must be recommended by two members, and upon admission must produce a register of baptism, or other satisfactory proof of age, together with a certificate signed by the surgeon of the society, stating his opinion as to the health of the candidate. He must also sign a declaration of the kind and amount of insurance for which he intends to provide by his monthly contributions, and also of his acquiescence in, and adherence to, the rules of the society.

Rules XX. to XXII. prescribe the form of application, and the mode of paying the allowance during sickness, so framed as to guard the society, as far as possible, against fraud on the part of the members.

Rule XXIII. disqualifies members from claiming any allowance in sickness until one year after admission to the society, or until all contributions that may be due shall have been paid up; and provides for withholding the allowance where the disease or infirmity has been contracted through profligacy, quarrelling, or drunkenness, or if the member should be imprisoned under any criminal conviction.

Rule XXIV. suspends the allowance in sickness if the claimant refuses to be seen by the medical or other officers of the society; or if by any wilful act or misconduct, such as drinking in a public-house, he shall delay the recovery of his health.

Rule XXV. provides that the sum assured at death shall be forfeited, if the member shall die by his own hand, or by the hands of justice.

Rule XXVI. provides that, *if any member shall be convicted of felony*, or shall by any false or fraudulent representation or demand obtain, or attempt to obtain, any allowance from the funds of the society, or if he shall enter the army or navy, or go abroad, he shall be excluded from the society, and all his interest and monies therein shall be forfeited; but those members who have been excluded because of their joining the army or navy may be re-admitted on the cause of exclusion ceasing, provided their health is good, and the contributions for the time of exclusion be paid, with interest.

Rule XXVII. fixes the amount of forfeits that shall be payable, if the contributions of members fall into arrear; and also the period at which, owing to such default, they shall cease to be members; eligible, however, to be re-instituted, upon sufficient cause for the default being assigned, and upon the arrears and certain fines being paid.

Rule XXVIII. fixes the last Saturday in each month for the payment of annuities to the members.

Rule XXIX. enables the trustees to pay to the relatives of persons dying intestate, and for whose effects no letters of administration shall be taken

out, the amount which may have been insured, in such manner as they shall think most beneficial.

Rule XXX. authorizes the society to purchase from any of its members the interest they may have in its funds.

Rule XXXI. facilitates the transfer of insurances from one friendly society to another, in the event of any member removing beyond the limits of the original society.

Rules XXXII. to XXXVII. relate to minor points of internal management.

The tables containing the rates of monthly contributions, which follow, are not applicable to the circumstances of all friendly societies, but will be found very near to the average rates generally adopted.

Table showing the sum to be contributed monthly by persons of the following ages when admitted, until they shall reach the age of seventy, to entitle them to receive 20*s.* weekly during sickness, at any time after one year from the time of admission to the age of seventy:—

Age next Birth-day.	Monthly payment. *s.*	*d.*	Age next Birth-day.	Monthly payment. *s.*	*d.*	Age next Birth-day.	Monthly payment. *s.*	*d.*
20	2	1	32	2	9¾	44	4	2¾
21	2	1½	33	2	10¾	45	4	5
22	2	2	34	2	11¾	46	4	7
23	2	2½	35	3	1	47	4	9¼
24	2	3¼	36	3	2¼	48	4	11¾
25	2	4	37	3	3½	49	5	2¼
26	2	4½	38	3	4¾	50	5	5¼
27	2	5¼	39	3	6¼	51	5	8¼
28	2	6	40	3	7¾	52	5	11½
29	2	7	41	3	9½	53	6	3
30	2	7¾	42	3	11¼	54	6	6¾
31	2	8¾	43	4	1	55	6	10¾

If the sum, the receipt of which it is desired to insure during sickness, should be less than 20*s.* per week, the contributions must be made in proportion. To entitle the member to receive 15*s.* per week, the payments must be three-fourths the above rate. For 10*s.* per week, the contributions are one-half the rates stated in the table, and so on. This rule is likewise applicable to the two following tables.

Table showing the sum to be contributed monthly by persons of the following ages when admitted, to secure the payment to them of a monthly annuity of 2*l.*, to commence from their attaining the respective ages of either 55, 60, 65, or 70, as agreed at the time of joining the society; the contributions to cease when the annuity commences:—

Age next Birth-day at the time of admission	Monthly Contributions which will insure an annuity of 2*l.* paid monthly.							
	To begin at the age of 55.		To begin at the age of 60.		To begin at the age of 65.		To begin at the age of 70.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
18	3	8½	2	2¼	1	3	0	7¾
19	3	11	2	4½	1	3¼	0	8
20	4	2	2	5¾	1	4¼	0	8½
21	4	5¼	2	7¼	1	5¼	0	9
22	4	8½	2	9¼	1	6¾	0	9½
23	5	0	2	11¼	1	7¼	0	10
24	5	4	3	1¼	1	9	0	10¾
25	5	8	3	4	1	10¼	0	11½
26	6	0¾	3	6¼	1	11¼	1	0
27	6	5¼	3	9¼	2	1	1	0¾
28	6	11	4	0¼	2	2¼	1	1¼
29	7	5	4	3½	2	4½	1	2¼
30	7	11¼	4	7	2	6¼	1	3¼
31	8	6¼	4	10¾	2	8½	1	4¼
32	9	2¼	5	3	2	10¼	1	5¼
33	9	11	5	7½	3	0¼	1	6¾
34	10	8¾	6	0¼	3	3½	1	7¼
35	11	7¼	6	5¼	3	6	1	9
36	12	7¼	6	11¼	3	9	1	10¼
37	13	9	7	6¼	4	0¼	2	0
38	15	0¼	8	1¼	4	3¾	2	1¼
39	16	5¾	8	9¾	4	7¼	2	[illegible]
40	18	1¼	9	7	5	0	2	5¼
41	.	.	10	5¼	5	5	2	7¾
42	.	.	11	4¾	5	10¼	2	10
43	.	.	12	5¾	6	4¼	3	0¾
44	.	.	13	8¼	6	10¾	3	3¾
45	.	.	15	1¼	7	6¼	3	7
46	.	.	.	.	8	2¼	3	10¼
47	.	.	.	.	8	11¼	4	2¼
48	.	.	.	.	9	10¼	4	7
49	.	.	.	.	10	10¾	5	0
50	.	.	.	.	12	0¼	5	5¾
51	.	.	.	.	.	.	6	0
52	.	.	.	.	.	.	6	7¼
53	.	.	.	.	.	.	7	3¾
54	.	.	.	.	.	.	8	1¼
55	.	.	.	.	.	.	9	0¼

Table showing the sum to be contributed monthly by persons of the following ages when admitted, until they shall reach the age of seventy, to insure the payment of the sum of 20*l.* at the time of death:—

Age next birth-day at the time of admission.	Monthly Contribution. *s.*	*d.*	Age next birth-day at the time of admission.	Monthly Contribution. *s.*	*d.*	Age next birth-day at the time of admission.	Monthly Contribution. *s.*	*d.*	Age next birth-day at the time of admission.	Monthly Contribution. *s.*	*d.*
16	0	6¼	26	0	9¼	36	1	0¾	46	1	6¼
17	0	7	27	0	9½	37	1	1¼	47	1	7¼
18	0	7¼	28	0	9¾	38	1	1¾	48	1	8¼
19	0	7½	29	0	10¼	39	1	2¼	49	1	9¼
20	0	7¾	30	0	10½	40	1	2½	50	1	10¼
21	0	8	31	0	10¾	41	1	3¼	51	1	11½
22	0	8¼	32	0	11¼	42	1	3¾	52	2	0¾
23	0	8½	33	0	11½	43	1	4½	53	2	2
24	0	8¾	34	1	0	44	1	5	54	2	3½
25	0	9	35	1	0¼	45	1	5	55	2	5¼

The number of friendly societies enrolled by the clerks of the peace in each county in Great Britain from the year 1829 to 1836, both inclusive, in conformity with the act passed in that year last mentioned, are as follow:—

County	Number	County	Number
Bedford	27	Brecon	53
Berks	15	Cardigan	26
Bucks	33	Carmarthen	32
Cambridge	38	Carnarvon	17
Chester	83	Denbigh	47
Cornwall	52	Flintshire	33
Cumberland	14	Glamorgan	112
Derby	53	Merioneth	19
Devon	187	Montgomery	20
Dorset	53	Pembroke	27
Durham	57	Radnor	8
Essex	59		
Gloucester	41	Total of Wales	394
Hants	38		
Hereford	20	Aberdeen	5
Hertford	51	Ayr	17
Kent	87	Dumbarton	3
Lancaster	189	Dumfries	1
Leicester	38	Edinburgh	46
Lincoln	21	Fife	2
Middlesex	346	Forfar	4
Monmouth	62	Kincardine	2
Norfolk	69	Lanark	25
Northampton	6	Linlithgow	2
Northumberland	30	Perth	1
Nottingham	27	Renfrew	11
Oxford	30	Ross	1
Rutland	4	Stirling	1
Salop	84	Wigton	1
Somerset	87		
Stafford	180	Total of Scotland	122
Suffolk	60		
Surrey	75		
Sussex	36	Total in England	2438
Warwick	58	Wales	394
Wilts	34	Scotland	122
Worcester	68		
York	26	Total in Great Britain	2954
Total of England	2438		

No friendly societies have been enrolled in Huntingdon, Westmoreland, and Anglesea. The returns from Scotland comprise only those societies from which returns of sickness and mortality have been received. Of the above societies there were enrolled in England and Wales—

	England.	Wales.	Total.
In 1829	55	3	58
1830	272	32	304
1831	400	49	449
1832	606	99	705
1833	346	64	410
1834	223	56	279
1835	416	72	488
1836	126	19	145
	2444		
Ceased	6		
	2438	394	2832

The above-mentioned societies do not comprise all, or nearly all, those which are in existence in Great Britain, and no similar account has been given for Ireland. According to a return printed by order of the House of Commons the number of friendly societies, the rules of which were filed by the clerks of the peace in England and Wales, and equivalent officers in Scotland and Ireland, between the beginning of 1793 and the end of 1832, were—

In England . . .	16,596
Wales . . .	769
Scotland . . .	2,144
Ireland . .	274
Total in the United Kingdom	19,783

Many of the societies included in this return have ceased to exist, but it is known that there are many still in being which have not been enrolled under the act of 1829; in fact the number which have deposited their funds with savings' banks very greatly exceeds those so enrolled. The number having made these deposits, and the amount of the sums deposited by them, as they stood on the 20th of November, 1836, were as follow:—

	Number of Societies.	Amount of Deposits.	Average by each Society.
		£	£
England .	4782	658,424	138
Wales .	269	40,728	151
Scotland .	92	11,521	125
Ireland .	266	16,622	63
Total	5409	727,295	134

It is to be regretted that hitherto no use has been made of the returns of sickness and mortality made under the act of 1829, of which it is understood that great numbers are deposited in the office of the Secretary of State, and with the barrister appointed to certify the rules of friendly societies. Several of these societies are composed of persons engaged in some particular calling; and if a careful analysis of the returns were made, it might, among other interesting and useful points of information, afford data for estimating the comparative healthiness of different trades, a matter hitherto very imperfectly understood or investigated. The experience of different Life Assurance Offices has made us pretty well acquainted with the rate of mortality among the higher and middle walks of life, and the general tables of mortality, although hitherto very imperfectly kept, afford a tolerable view of the law of human life in the aggregate in this country; but it is very desirable to know as accurately as possible the experience, in regard both to sickness and mortality, of institutions, the members of which are taken from the working classes, since there could perhaps be no surer test discovered whereby to judge of the progress of civilization than this, which would mark the greater or smaller approximation made by the great bulk of the people following different employments and placed in different localities, towards the substantial and necessary comforts enjoyed by the easier classes.

To supply this deficiency 'The Society for the Diffusion of Useful Knowledge' prepared various schedules, and distributed the same to friendly societies in most of the counties in England, and obtained in consequence a considerable number of returns applying to the five years that occurred between the beginning of 1823 and the end of 1827. These returns were placed in the hands of Mr. Charles Ansell, actuary to the Atlas Insurance Company, who has made them the groundwork of a 'Treatise on Friendly Societies, in which the Doctrine of Interest of Money, and the Doctrine of Probability, are practically applied to the Affairs of such Societies.' It is not necessary in this place to borrow from Mr. Ansell's elaborate calculations more than the following table, which exhibits the amount of sickness and mortality that actually occurred during five years among all the friendly societies from which returns were obtained, and affords the most precise information that has yet been given concerning the casualties to which the working men of England are liable. An additional column is given, deduced from the 'experience' of the Equitable Society, drawn from the actual duration of all the lives assured by that corporation from 1762 to 1829, a period extending over two-thirds of a century; and this will serve to show the great discrepancies exhibited in Mr. Ansell's table, which unavoidably arise from the limited materials with which that gentleman was furnished.

Age	Mean annual quantity of Sickness, expressed in weeks and decimals of a week.	Annual rate of Mortality, showing out of what number one would die.	Annual rate of Mortality, showing out of what number one would die, according to the Equitable experience.
18	·500	—	130·88
19	·574	—	135·60
20	·671	—	136·50
21	·725	138·50	139·60
22	·785	165·00	138·61
23	·861	186·50	137·60
24	·888	110·22	136·60
25	·850	108·82	131·61
26	·712	125·27	130·61
27	·614	122·15	129·41
28	·711	96·95	128·61
29	·930	81·69	127·61
30	·828	74·59	123·—
31	·753	80·19	122·—
32	·927	109·32	117·64
33	·992	98·29	113·75
34	·939	83·25	109·52
35	·903	60·06	108·52
36	·898	51·24	104·76
37	1·093	60·07	101·17
38	1·291	53·03	95·41
39	1·226	55·89	92·21
40	1·127	75·—	91·21
41	1·023	74·56	88·16
42	1·094	51·60	87·16
43	1·249	48·69	86·16
44	1·328	58·71	83·27

Age.	Mean annual quantity of Sickness, expressed in weeks and decimals of a week.	Annual rate of Mortality, showing out of what number one would die.	Annual rate of Mortality, showing out of what number one would die, according to the Equitable experience.
45	1·308	56·48	78·76
46	1·390	48·48	77·76
47	1·379	48·05	75·17
48	1·508	48·56	72·65
49	1·816	45·88	70·22
50	1·784	42·59	66·55
51	1·706	29·86	61·98
52	1·875	37·63	57·82
53	2·040	95·67	53·16
54	2·110	55·40	50·53
55	2·526	38·64	48·03
56	2·869	24·91	44·34
57	2·758	22·24	40·45
58	2·436	31·08	37·45
59	2·675	24·86	34·28
60	3·042	23·67	31·77
61	3·782	27·67	30·09
62	4·553	29·75	28·77
63	5·180	21·20	27·17
64	5·385	14·69	25·62
65	5·423	16·18	23·39
66	5·615	17·22	21·32
67	6·222	18·14	19·76
68	8·852	26·50	18·25
69	12·420	17·60	16·65
70	13·930	14·50	15·65
71	14·402	14·50	14·65

Age.	Mean annual quantity of Sickness, expressed in weeks and decimals of a week.	Annual rate of Mortality, showing out of what number one would die.	Annual rate of Mortality, showing out of what number one would die, according to the Equitable experience.
72	14·167	7·83	13·65
73	8·279	6·17	12·65
74	4·321	6·50	11·65
75	14·262	7·00	10·74
76	24·719	19·00	10·19
77	41·111	—	9·54
78	31·095	14·00	8·88
79	30·636	11·00	8·35
80	23·571	—	7·52
81	1·400	—	6·74
82	1·000	7·00	6·08
83	—	6·00	5·10
84	3·000	—	4·76
85	18·333	—	4·52
86	21·250	8·00	4·30
87	31·428	7·00	3·93
88	44·000	—	3·62
89	52·000	—	4·04
90	52·000	—	3·72
91	34·666	—	3·50
92	14·000	—	3·18
93	—	—	3·00
94	—	—	2·28
95	—	—	1·80
96	—	—	1·33
97	—	—	1·00

FRIENDS. [QUAKERS.]

FRIESLAND, or VRIESLAND, the most northerly province of the kingdom of Holland, is situated between 52° 40′ and 53° 28′ N. lat., and 5° 24′ and 6° 46′ E. long., and is bounded on the north by the North Sea, on the east by the provinces of Groningen and Drenthe, on the south

and south-east by that of Overyssel, and on the west and south-west by the North Sea and Zuidersee. It is sometimes called West Friesland, in order to distinguish it from East Friesland in Hanover: but is not called by that name in Holland itself. The area of Friesland is about 1027 square miles, and the population, which was 176,554 in the year 1818, 207,425 in 1831, and 217,882 in 1835, is now estimated at about 221,000. The surface, as well as the soil itself, are so identified in character with those of the province of North Holland that there cannot be a doubt that they formed one and the same country antecedently to the convulsion out of which the Zuidersee, which now separates them, arose. There are many parts of Friesland which, like North Holland, lie lower than the level of the sea, and are protected from the storms of the North Sea by costly artificial dykes. The whole land is flat and intersected by canals: nor is there an eminence throughout it excepting some mounds, here called "terpen," on which the antient Frisians were accustomed to take refuge in seasons of marine inundations. In all parts there are deep swamps and marshy bogs, between which, especially in the south and east, tracts of sand and moor, or low meagre woodlands, occasionally interpose. The canals, which are frequently higher than the land they drain (the water being pumped up into them), and have enabled human industry to bring it under cultivation, mostly join the great canal, which begins at Haarlingen, a port in the west, and leads through Franeker, Leeuwarden, and Dokkum to Groningen. The lowlands near the coast, particularly in the north-west, are mostly appropriated to the feeding of cattle; and the interior of the province, where the ground is somewhat more elevated, to the growth of corn. Friesland has no river of any note excepting the Lauwers, which falls into the gulf of that name, after forming the boundary in part between this province and Groningen. Of the other streams, the Baare, Linde, Paassens, &c., the first only is navigable for small craft: the others are broad rivulets of inconsiderable lengths. There are a multitude of small lakes, called Meeren, the majority of which have been formed by extensive diggings for turf, and are well stocked with fish. Of late years many of them have been drained either in part or wholly, and converted into polders, or inclosures of arable and pasture land. The principal occupation of the people is breeding cattle, growing corn, fishing, and digging and preparing turf for fuel. The stock of cattle is about 170,000, and above 5,000,000 pounds of butter and 1,000,000 of cheese are annually exported, but the quality is inferior to that of the western provinces of Holland. There are numerous flocks, but they are of an inferior breed, and the wool is coarse. A great quantity of lambs are exported; and a considerable number of horses are bred: the stock of the latter is about 30,000; they are strong limbed and stand high, and are much sought after as carriage horses. Swine are reared everywhere, and fed with a view to the production of lard rather than for meat. The agricultural produce of Friesland is more than adequate to its consumption, and some corn is exported: the chief articles of growth are wheat, rye of superior quality, remarkably fine pease, potatoes, buckwheat, and clover seed, which last is exported largely. One of the effects of the extensive cultivation of clover is that the honey of Friesland stands in great repute. There are few manufactures: they include wooden clocks, woollen stuffs, linen, sail cloth, salt, paper, and tiles. Ship-building is also carried on.

The inhabitants are principally adherents of the Reformed Lutheran church; there are 207 cures of souls attached to this persuasion, 58 to the Mennonite, and 24 to the Roman Catholic, besides 2 Lutheran congregations. Their language has a greater similarity to the German than the Dutch: in this respect, indeed, as well as in their dress and manners, they have retained much that was common to their ancestors, the Frisians. In the larger towns Dutch is spoken.

Friesland contains 11 towns, 1 market village, and 336 other villages and hamlets; and is divided into 3 circles, Leeuwarden in the north, and Sneek and Herrenveen in the south, and 30 gritenien, or bailiwicks. The chief town is Leeuwarden [LEEUWARDEN], about 21,000 inhabitants, in the west; Franeker, on the canal from Leeuwarden to Haarlingen, an old town, with about 400 houses and 4200 inhabitants, a high school, botanic garden, and tile manufactories; Haarlingen, a seaport on the Zuidersee, with about 1200 houses, and a population of about 7600, 5 churches, and manufactures of sailcloth, paper, salt, &c., and a brisk foreign trade; Dokkum, a well-built town, with about 600 houses and 3600 inhabitants, 2 churches, a handsome town-hall with a steeple, manufactures of beer, brandy, salt, &c., and a brisk trade in butter and cheese. The preceding towns, as well as the islands of Ameland, with 3 villages and a population of about 3000 employed in navigation, fishing, cattle-breeding, and agriculture, and of Schiermonikoog, with about 1600 inhabitants, are in the circle of Leeuwarden. In that of Sneek are the chief town of that name, on the canal between Lemmer and Leeuwarden, with 2 churches, about 1100 houses, and 6000 inhabitants, a town-hall, manufactures of pottery, linen, deals, oil, &c., and much trade in corn and butter; Staveren, a seaport on the most south-westerly point of Friesland, once the residence of the Frisian kings, with about 2000 inhabitants; and Workum, a port on the Zuidersee, with about 3000 inhabitants, chiefly engaged in shipping and fisheries. In the circle of Herrenveen is the market-village of that name, and chief place of the circle, built in the midst of moors of turf, with a population of about 1200; and Langezwaag, a village of about 5000 inhabitants.

The portion of Friesland on the west side of the Ems, commonly called West Friesland, was annexed to the United Provinces, now the kingdom of Holland, on the establishment of their independence in 1609.

FRIESLAND, EAST. [AURICH.]

FRIEZE. [CIVIL ARCHITECTURE; COLUMN.]

FRIGATE. [SHIP.]

FRIGATE (Zoology). [PELECANIDÆ.]

FRIGIDA'RIUM. [BATH.]

FRINGE TREE, the English name of the American shrub Chionanthus virginica.

FRINGI'LLIDÆ (ornithology), the family of Finches. This, according to Mr. Vigors, contains, in addition to *Alauda* [LARK], to which *Emberiza* (the Buntings) and its affinities, he observes, seem nearly allied, the greater part of the Linnæan *Fringillæ*, together with the Linnæan *Tanagræ* [TANAGER], which approach them in their external characters and in their habits, as far as has hitherto been ascertained. These latter groups contain many natural genera which may be traced, in his opinion, from the point of their connexion with the Linnæan *Fringillæ*, back, by a gradual increase of the base of the bill in breadth and height, to the family of *Loxiadæ* [LOXIADÆ], which unites with them at the opposite extremity of the series of families which compose the tribe. The *Fringillidæ*, again, according to the same author, by means of the sharp-pointed and lengthened bill of *Carduelis*, and by the extension of the *culmen* of the upper mandible in an angular form for some extent upon the front of the head, conduct us, on the other side, to the genus *Icterus*, Briss., which commences the succeeding family. Here, Mr. Vigors thinks that the genus *Ploceus* of Cuvier also seems to hold an intervening station between the two groups, so as to render it difficult to decide in which of them it should be placed. There is also, he states, another decided line of relationship between the two families, viz., that which some species of the Linnæan *Alauda*, particularly *A. Capensis*, bear to the *Sturnus Ludovicianus*, or *Crescent Stare* of Dr. Latham. This latter bird is well known as the *Alauda magna* of Linnæus, and of the American ornithologists. But its still stronger affinity to the *Sturni* and *Icteri* necessarily places it among them. The former relationship appears to Mr. Vigors to be one of analogy, not of affinity; while the direct passage between the families is found in *Ploceus* (the Weaver Birds). [WEAVER BIRDS.] Mr. Vigors makes *Fringillidæ* the first, and *Loxiadæ* the last family of the *Conirostres*. Mr. Swainson makes the *Fringillidæ* (including *Loxia* apparently—for his Conirostres consist of the *Corvidæ*, *Sturnidæ*, *Fringillidæ*, *Musophagidæ*, and *Buceridæ*, omitting *Loxiadæ*)—the third family; and the order of the names given will show the position he assigns to it. 'No group in the ornithological circle,' writes Mr. Swainson in his *Classification of Birds*, vol. i., 'exhibits this powerful structure (strength of the bill), so much as that of the *Fringillidæ*,' where the bill is short and nearly conic; both mandibles are equally thick, and when closed their height and breadth are nearly the same. In many of the Finches (as in the subgenera *Amadina*, *Coccothraustes*, &c.) the thickness of the bill at its base in comparison to the size of the head is enormous; but in the *Loxia ostrina* of Vieillot, a rare

and most extraordinary bird from Western Africa, the bill is not much inferior to the size of the head. It is well known that all these 'hard-billed' birds, as the old writers aptly called them, feed entirely upon seeds and nuts; and the harder these are the stronger are the bills of such species as are appointed to derive nourishment from the different sorts; whenever an insectivorous and frugivorous diet is united, as is the case with most Tanager finches, the upper mandible is notched for the obvious purpose of more firmly securing that part of their food which can escape.'

M. Lesson, in his 'Table Méthodique,' places the *Fringillidæ* as the third family of the *Conirostres*, and makes it consist of the following genera:—*Emberiza* of Linnæus, *Emberizoïdes* of Temminck, *Fringilla* of Linnæus, viz., *Pyrgita, Fringilla*, and *Carduelis* of Cuvier, *Linaria* of Bechstein, *Vidua* of Cuvier, *Coccothraustes* of Brisson, *Pyrrhula* of Brisson, *Loxia* of Brisson, *Psittirostra* of Temminck, *Corythus* of Cuvier, *Colius* of Brisson and Linnæus, *Phytotoma* of Molina, and *Ploceus* of Cuvier.

Cuvier, in his 'Règne Animal,' arranges the Buntings (*Emberiza* of Linnæus) immediately after the Titmice (*Parus* of Linnæus); and, next to the Buntings, he places the Sparrows, *les Moineaux* (*Fringilla* of Linnæus).

Cuvier designates the Buntings as possessing an extremely distinct character in their conical, short, straight bill, the narrower upper mandible of which, entering within the lower, has on the palate a hard and projecting tubercle; and as granivorous birds which have little caution, and readily enter the snares prepared for them. Those Buntings which have an elongated nail on the hind toe like the larks, are distinguished by Meyer under the generic name of *Plectrophanes*.

The *Sparrows* (*Fringilla*) are characterized by Cuvier as having a conical bill more or less large at its base, but not angular at the commissure. They subsist principally on seeds, and are subdivided by that zoologist as follows:—The *Weavers* (*Ploceus*, Cuv.), a form found in both the old and the new continents. Those of the old world make a nest by interweaving very skilfully the fibres of vegetables, whence their name. Such are the *Toucnam Courvi* of the Philippine Islands (*Loxia Philippina* of Linnæus), with its pendulous nest, having a vertical canal opening below, which communicates laterally with the cavity where the young are laid, and the *Republican* (*Loxia socia* of Latham), which builds in society, and whose conjoined nests form one large continuous mass with numerous compartments. Among the Weavers of the new continent Cuvier places *Le Mangeur de riz, petit Choucas de Surinam, de la Jamaïque, Cassique noir*, &c. (*Oriolus niger, Or. oryzivorus, Corvus Surinamensis*, Gm.), which, in countless flocks, lay waste the fields of many of the warm parts of America. Next to the *Weavers* are placed the *Sparrows*, properly so called (*Pyrgita* of Cuvier), of which the well known *Common*, or *House Sparrow* (*Fringilla domestica* of authors, *Pyrgita domestica* of Cuvier), the companion of civilized man on a large portion of the globe, may serve as the type. Cuvier makes the *Finches, les Pinçons* (*Fringilla* of Cuvier), follow. These have the bill rather less arched than the sparrows, and a little longer and stronger than the linnets. Their habits are more gay, and their song more varied than those of the sparrows, and the *Chaffinch, le Pinçon ordinaire* (*Fringilla cœlebs* of Linnæus), may be taken as an illustration of the genus. [CHAFFINCH.] The *Linnets* and *Goldfinches* (*les Linottes, Linaria* of Bechstein) and *Chardonnerets* (*Carduelis* of Cuvier) come next, and the *Serins*, or *Tarins*, Canary birds, for example. [CANARY BIRD.] Then come the *Whidah Finches, Widow Birds*, as they are popularly called (*Vidua* of Brisson and other authors), and next to them the *Grosbeaks, Gros-becs* (*Coccothraustes* of Brisson and others), to which Cuvier considers there is a gradual passage from the linnets without any assignable interval, and whose completely conical bill is only distinguishable by its excessive size: of these the *Common Grosbeak* (*Loxia Coccothraustes* of Linnæus) may be considered as the type. *Pitylus*, to which Cuvier assigns certains foreign species, succeeds. It has, as well as *Coccothraustes*, a large bill, which is slightly compressed, arched above, and sometimes has a salient angle in the middle of the edge of the upper mandible. The *Bullfinches* (*Pyrrhula*) conclude the tribe.

After the *Sparrows* Cuvier places the *Crossbills* (*Loxia* of Brisson), and the *Durbecs* (*Corythus* of Cuvier, *Strobilophaga* of Vieillot), observing that they cannot be placed at a distance from the bullfinches and crossbills. The bill of *Corythus*, convex all round, has its point curved above the lower mandible. *Colius* he considers as nearly approaching the preceding.

M. Temminck thus defines the character of the *Buntings* (*Emberiza* of Linnæus). *Bill* short, strong, conical, compressed, trenchant, without a notch, mandibles having their edges included (the upper mandible being smaller than the lower), and a little distant from each other at the base *Nostrils* basal, rounded, surmounted by the frontal feathers which partially cover them. *Feet* with three anterior and one posterior toe, the anterior toes entirely divided, and the posterior toe with a short and curved nail: in a small number of species this nail is straight and long. *Wings* with the first quill rather shorter than the second and third, which are the longest. *Tail* forked or slightly rounded.

It will be observed that in this generic character M. Temminck has omitted the projecting tubercle on the palate; and he gives as a reason for this omission, that it is not visible externally.

Food, Habits, Reproduction.—The principal food of the Buntings consists of farinaceous seeds, to which insects are occasionally added. The greater number haunt woods and gardens, and build their nests in bushes. Those which have the posterior nail or claw long, live among the rocks, or in the plains, and do not frequent the woods. In almost all the species the sexes present a marked difference, the males being variegated with lively and well defined colours. The young may be distinguished from the females, which they much resemble by their more sombre colouring, and a greater number of deep spots. None of the indigenous species moult twice, but the greater part of the foreign species do so regularly, and the colours of the males change considerably in these two moults: in the summer they are adorned with brilliant colours; in the winter they put on the modest livery of the females. (Temminck.)

The same ornithologist divides the Buntings into two sections.

I.

The Buntings properly so called.

These have the posterior claw short and curved, and live in the woods and gardens. They appear to moult but once a year. Some parts of their plumage which are coloured with lively tints in the summer are clouded in winter by the ashy shading with which the feathers are terminated; these colours are without mixture in the spring, especially the deep black, till it becomes clouded with reddish after the autumnal moult. The common *Yellow Hammer* (*Emberiza citrinella*) may be taken as an example of this section, which also contains, among other species, the *Ortolan* (*Emberiza hortulana* of Linnæus, *Ortolan Bunting* of Latham) and the *Cirl Bunting* (*Emberiza Cirlus* of Linnæus).

II.

The Spur Buntings (*Bruans Eperonniers, Plectrophanes* of Meyer).

This section has the back claw long and but very slightly arched. The species composing it live always on the ground in open places. Their moult is simple and ordinary, but the colours of the plumage change considerably by rubbing and the action of the air and light, so that their summer dress appears very different from that which these birds assume in the autumn.

The numerous genera into which, as we have seen, the genus *Fringilla* of Illiger has been subdivided do not accord with M. Temminck's views; and as this excellent ornithologist has as much practical experience as any of those who have made this interesting branch of natural history their study, and perhaps more, we think it right to put the student in possession of his opinions on this subject.

M. Temminck, then, thus defines his genus *Gros-bec* (*Fringilla* of Illiger). *Bill* short, strong, convex, straight, and completely conical; upper mandible swollen as it were, a little inclined towards the point, without any *arête*, and with the upper part depressed, often prolonged into an angle between the frontal feathers. *Nostrils* basal, round, placed near the front, behind the horny elevation of the swollen part of the bill, partially hidden by the feathers of the front. *Feet* with the tarsus shorter than the middle toe; the anterior toes entirely divided. *Wings* short; the second or third quills graduated, the third or fourth longest. *Tail* varying in form.

Food, Habits, Reproduction, &c.—These birds, says M.

Temminck, feed on all sorts of seeds and grains, which they open with the bill, at the same time rejecting the husk; it is only very rarely that insects are added to this diet. They inhabit all the countries of the globe, but particularly the regions of the torrid zone and warm latitudes. They raise many broods annually, collect together in numerous flocks, and migrate in associated flights. Of all the winged class they are, after the Pigeons and Gallinaceous Birds, the most easily domesticated. The greater number of foreign species and some European undergo a double moult. When this takes place, the male assumes in winter the livery of the female. The young of the year differ from the old ones before the autumnal moult; but after that period it becomes impossible to distinguish them.

Upon this extensive genus M. Temminck proceeds to remark that methodists have essayed to class these birds in many genera, under the designations of *Strobilophoga*, *Coccothraustes*, *Fringilla*, *Passer*, *Pyrgita*, *Vidua*, *Linaria*, and *Carduelis*. The manners of all these birds being, with some slight shades of difference, absolutely the same, it is impossible, in his opinion, to have recourse to the invention of new names as the means of subdividing this great group. M. Temminck declares that he took the greatest pains to compare more than a hundred foreign species with our indigenous species, and the result of this examination confirmed him in the conclusion that there exists a gradual passage, without any demarcation, from one species to another. This natural series has, he observes, been recognised by Illiger, who unites all these birds with a thick and conical bill (*à bec gros et conique*) in one great genus under the name of *Fringilla*, comprising the Bullfinches (*Pyrrhula*) therein. M. Temminck, however, thinks that these last ought to be classed in a distinct genus, in consequence of the form of the bill, certain habits, and perhaps, also, with reference to the countries they inhabit. The genus *Loxia*, he remarks, has been restored by Illiger to the limits assigned to it by Brisson; and he adds that he (M. Temminck) has separated from the genus *Loxia* of Linnæus a species singularly characterized by the form of the bill, under the name of *Psittirostra*. M. Cuvier, he goes on to observe, has, in the *Règne Animal*, indicated, rather than established characteristically, many genera and subgenera. M. Cuvier allows that there is a gradual passage, without any assignable interval, from the *Linnets* to the *Grosbeaks*. The species of his genus *Vidua*, or *Widow Birds*, are distinguished by some of the upper coverts of the tail being excessively elongated in the males. This distinction, available for recognising the males only, disappears in the moult; for in winter they have no conformation of the tail differing from that of the females; and at that season it would be difficult to pronounce whether they were Linnets, Sparrows, or Finches (*Pinsons*). M. Temminck agrees that to facilitate the methodical arrangement of the great number of species composing this genus, it is necessary to have recourse to an artificial classification, by the aid of which the species may be easily found. The simplest method, in his opinion, is to form three sections in the genus *Fringilla*, under indications which have more or less reference to the three different groups of bills, which may be separated into *Laticones*, *Brevicones*, and *Longicones*. In the first section may be comprised, he thinks, the greater number of the pretended *Loxiæ* of authors, some soi-disant *Bengalies*, and the *Sparrows* (*Moineaux*), which resemble ours in the colours of their plumage; in the second, some *Sparrows* (*Moineaux*) of authors, the Finches (*Pinsons*), the Linnets (*Linottes*), and those indicated as *Widow Birds* (*Viduæ*), *Bengalies*, and *Senegalies*; in the third the *Tarins*, some *Senegalies*, and the *Chardonnerets*.

I.

The Laticones.

(Bill large, convex, more or less swollen on the sides.)

The *Grosbeak*, *Haw Grosbeak* or *Hawfinch* (*Loxia coccothraustes* of Linnæus, *Fringilla coccothraustes* of Temminck) is placed by that author at the head of this section, which contains, among other species, the *Green Grosbeak* or *Greenfinch* (*Loxia Chloris* of Linnæus, *Fringilla Chloris* of Temminck) and the Common Sparrow.

II.

The Brevicones.

(Bill in the shape of a cone, more or less short, straight, and cylindrical, often conical throughout.)

M. Temminck commences this section with the *Chaffinch* The *Linnets* also belong to it.

III.

The Longicones.

(Bill in the form of a straight cone, long and compressed; points of the two mandibles sharp.)

The *Citril Finch* (*Fringilla Citrinella* of Linnæus) appears at the head of this section, which also comprises, among other species, the *Siskin* (*Fringilla spinus* of Linnæus), the *Lesser Red Pole*, and the *Goldfinch*.

In the second volume of his 'Classification of Birds,' lately published (1837), Mr. Swainson makes the *Coccothraustinæ* the typical group, a subfamily composed of the hawfinches, weavers, goldfinches, and linnets. They live entirely upon trees, and have the bill very strong and entire. Genus, Coccothraustes; subgenera, *Pyrenestes*, Sw., *Coccoborus*, Sw., *Coccothraustes*, Briss., *Spermophaga*, Sw., *Dertroides*, Sw. Genus, Ploceus; subgenera, *Vidua*, Cuv., *Euplectes*, Sw., *Ploceus*, Cuv., *Symplectes*, Sw. Genus, Amadina, Sw., (*Bengaly*); subgenera, *Estrelda*, Sw., *Amadina*, Sw., *Spermestes*, Sw., *Erythura*, Sw., *Pytelia*, Sw. Genus, Tiaris, Sw.; Genus, Carduelis, Sw.; Genus, Linaria, Briss.; subgenera, *Linaria*, *Leucosticte*, Sw., *Chloris*, Sw. The second or subtypical group he makes to contain the *Tanagrinæ*. Genus, Tardivola, Sw.; Genus, Tanagra, Linn.; subgenera, *Pitylus*, Cuv., *Tanagra*, Linn., *Ramphopis*, Vieill. Genus, Phœnisoma, Sw.; subgenera, *Lamprotes*, Sw., *Phœnisoma*, Sw., *Tachyphonus*, Vieill., *Leucopygia*, Sw. Genus, Nemosia, Vieill.; Genus, Aglaïa, Sw.; subgenera, *Euphonia*, Sw., *Tanagrella*, Sw. Genus, Pipillo, Vieill.; subgenera, *Arremon*, Vieill. The third consists of the *Fringillinæ* or true finches, differing materially from the two former; their bills are generally smaller, but more perfectly conic; seeds form their food almost entirely; and they chiefly live upon the ground. Genus, Pyrgita, Antiq.; subgenera, *Aimophila*, Sw., *Leucophrys*, Sw. Genus, Fringilla, Linn.; subgenera, *Passerella*, Sw., *Fringilla*, *Zonotrichia*, Sw., *Ammodramus*, Sw., *Chondestes*, Sw. Genus, Emberiza; subgenera, *Emberiza*, Linn., *Fringillaria*, Sw. Genus, Leptonyx, Sw.; subgenus, *Melophus*, Sw. Genus, Plectrophanes, Meyer; subgenera, *Miliaria*, Sw., *Plectrophanes*, Meyer. Genus, *Agrophilus*, Sw. The fourth contains the *Alaudinæ*. Bill much more slender than in any of the preceding; hind claw always more or less lengthened. Genus, Alauda, Linn.; Genus, Calendula, Linn.; subgenera, *Mycfra*, Horsf., *Braconyx*, (Brachonyx ?) Sw. Genus, Agrodroma, Sw.; Genus, Macronyx, Sw.; Genus, Certhilauda, Sw. Mr. Swainson considers that the *Alaudinæ* pass into, fifth, the *Pyrrhulinæ* (Bullfinches). Genus, Pyrrhulauda, Smith; genus, Pyrrhula; subgenera, *Crithagra*, Sw., *Spermophila*, Sw Genus, Psittirostra, Temm.; Genus, Corythus, Cuv.; Genus, Hæmorrhous, Sw.; Genus, Loxia, Linn.

On the 10th January, 1837, Mr. Gould (who, in his great work on the Birds of Europe, adopts the Genus *Erythrospiza* of the Prince of Musignano) exhibited to the Zoological Society, from Mr. Darwin's collection, a series of *Ground Finches*, so peculiar in form that he was induced to regard them as constituting an entirely new group, containing 14 species, and appearing to be strictly confined to the Gallapagos Islands; and he proposed the following generic names for them: *Geospiza*, *Camarhynchus*, *Cactornis*, and *Certhidea*, giving at the same time their characters. On a subsequent evening, Mr. Darwin remarked that these birds were exclusively confined to the Gallapagos Islands; but their general resemblance and their indiscriminate association in large flocks rendered it almost impossible to study the habits of particular species. In common with nearly all the birds of these islands, they were so tame that the use of the fowling-piece in procuring specimens was quite unnecessary. They appeared to subsist on seeds deposited on the ground in great abundance by a rich annual crop of herbage. (*Zool. Proc.*, 1837.)

Having thus endeavoured to give the student a general sketch of this family of birds, and the views of some of the leading ornithologists with regard to them, we shall hereafter, as far as our limits will permit, give a description of a few of the most remarkable forms of the species which compose it. Our own woods, hedges, and plains afford ample materials for every observer who would study the characters of this widely-diffused group

FRISCHES HAFF, an inclosed arm of the Baltic, lying between 54° 12′ and 54° 48′ N. lat. and 19° 10′ and 20° 31′ E. long. It belongs to the province of Eastern Prussia; its length from Holstein, a village at its N.E. extremity, about 42 miles W. of Königsberg, to its south-western extremity near Yungfer, a village N.E. of Elbing, is about 60 miles: its mean breadth is about 11½, and its greatest about 18½ miles; and it occupies an area of about 310 square miles. It is separated from the Baltic by a narrow tongue of land or sandbank called the Frische Nehrung, on which are the hamlets of Neuburg, Kahlberg, and Prebbenau, and at the north-eastern extremity of which, opposite to Pillau, there is a narrow strait, 12 feet deep and 3000 feet wide, called the Gatt. This passage was formed by an inundation of the waters of the Haff in the year 1510. In consequence of the shallowness of water in the Frische Haff, particularly in summer, no large vessels can navigate it, and Pillau is therefore the port both of Königsberg and Elbing. Among the numerous streams which find an outlet in this Haff, are the Pregel, Frisching, Passarge, Baude, and two arms of the Vistula, of which the most southernly, on quitting the main channel of that river, takes the name of the Nogath and flows past Elbing. The towns of Fischhausen, Brandenburg, Frauenburg, and Tolkemit, are on the northern and western banks of the Haff.

FRISCHLIN, NICODEMUS, born in 1547, was the son of a Protestant clergyman in the duchy of Würtemberg. He showed at an early age a great aptitude for the study of languages, became an accomplished scholar, and was made professor in the university of Tübingen, where he wrote his Paraphrases of Virgil's Bucolics and Georgics, and of Persius, as well as a great quantity of original poetry, and several dramas, for one of which, entitled 'Rebecca,' he was crowned with a gold laurel crown by the Emperor Rudolf II. at the Diet of Ratisbon, with the title of poet laureate. But his satirical humour made him enemies, and being charged with adultery, he was obliged to leave Tübingen. After visiting several towns of Germany, he at last settled at Mayence, where he published some of his works. In consequence, it would seem, of fresh satirical effusions from his pen, the duke of Würtemberg caused him to be arrested at Mayence, and shut up in a tower, from whence he attempted to escape, but fell in so doing from a great height, and died of the fall in November, 1590, being 43 years of age. He wrote a great number of works, the principal of which are: 1. 'De Astronomicæ Artis cum Doctrinâ Cœlesti et Naturali Philosophia convenientiâ;' 2. 'Institutiones Oratoriæ;' 3. Several Orations; 4. A work on education entitled 'De Ratione instituendi Puerum ab anno ætatis sexto vel septimo ad annum usque sextumdecimum;' 5. 'Dialogus Logicus contra P. Rami Sophisticam pro Aristotele,' and other treatises against the schoolmen; 'Facetiæ Selectiores,' many of them licentious; 7. 'Quæstionum Grammaticarum, libri octo;' 8. 'In Tryphiodori Ægyptii Grammatici librum de Ilii excidio, interpretatio duplex et notæ ad textum Græcum;' 9. 'Notes on Callimachus;' 10. 'Aristophanes repurgatus a mendis et interpretatus;' 11. 'In ebrietatem Carmina;' and a quantity of verses, elegies, satires, epigrams, besides the dramas and the paraphrases of classic authors above mentioned.

(Teissier, *Eloges des Hommes Savans;* Moreri's *Dictionary*, art. 'Frischlin.')

FRISIANS, a people of Germany, who formed part of the nation of the Ingævones. Their name has been by some derived from the low German word 'fresen,' to shake or tremble, in allusion to the nature of their country, the soil of which is an unstable or shaking moor. They were divided into Frisii Minores, who inhabited the lands north of the island of the Batavi—the present provinces of Oberyssel, Gelders, and Utrecht, and the greater part of the province of Holland, inclusive of the Zuidersee, which at that time was mostly dry land; and the Frisii Majores, who inhabited the land between the Yssel, Ems, and the country of the Bructeri—that is, the present provinces of West Friesland and Groningen. The old Rhine separated them from the Batavi, and the Ems from the Chauci. According to Tacitus (*Ann.* ii. c. 24) they were the most steadfast allies whom the Romans possessed in this quarter; they aided Drusus and Germanicus in their campaigns against the Cherusci, and saved the Roman fleet from destruction at the mouth of the Ems. But this state of amity was broken off upon the Romans making an attempt to treat them as subjects; they thenceforward became declared enemies of Rome, and razed, with one exception, all her strongholds in these parts, having in the 28th year A. D., when Olennius was the Roman lieutenant, turned upon the Romans, slain about 900 of them near the woods of Baduhenna, and freed themselves from their dominion. (*Tacit. Ann.* iv. c. 72, 73.) Corbulo, the Roman general under Claudius, A. D. 47, reduced them to obedience, and Nero drove them out of some districts on this side of the Zuidersee, which they had invaded. (*Tacit. Ann.* xiii. c. 54.) From this period until the fourth and fifth centuries, when they appear as members of the great confederacy of the Saxons, no mention of them occurs. We find them at this time holding the sea-coasts from the Schelde to the Elbe and Eyder, whence it has been conjectured that a variety of tribes were then comprehended under the name of Frisians. They now passed over into Britain, in company with the Angles and Saxons, and aided them in its conquest. Under the emperor Julian they made themselves masters and retained possession of the island of the Batavi, on which spot they were sorely humbled by Pepin, major-domo of the Franks, who put Radbod their king to flight, and wrested the whole of their western lands from them as far as the mouths of the Rhine. Poppo, Radbod's successor, made a fruitless attempt to recover the lost territory, and was driven back by Charles Martel. Charlemagne hereupon brought the eastern dominions of the Frisians under subjection, and appointed his own dukes over them, whose office subsequently merged into that of chieftain (häuptling.) The result of continued struggles for the mastery between these chieftains, who called themselves counts, was, that count Edzard prevailed, and established himself in that part called East Friesland in 1458. In 1657 count Enno acknowledged it as a fief of the empire under the emperor Ferdinand, and was raised by him to the dignity of a sovereign prince; but both his power and that of his descendants was jealously limited by the national states. The last prince died in 1744, and by virtue of an imperial grant in 1690, Prussia took possession of East Friesland. It was wrested from her in 1808, and transferred to Holland; in 1810 it became a province of the French empire; in 1813 Prussia recovered it, and in 1815 she ceded it to Hanover.

The western part of the Frisian territory, or West Friesland, is a province of the kingdom of Holland.

The antient Frisians resembled the Germans in their habits and mode of living, and according to Tacitus, the only tribute they could afford to pay the Romans consisted of skins. They were governed by two princes, whose authority was extremely confined. Their descendants are settled among the small islands on the western coast of the duchy of Schleswig, and preserve not only the name of Frisians, but many vestiges of their customs and dress. They wander in quest of a livelihood to Holland and the neighbouring countries, and return home with the produce of their labours. (Tacitus' *Annals;* Wiarda's *History of E. Friesland.)*

FRIT. [GLASS.]

FRITH, or **FIRTH**, is used on the eastern coast of Scotland to indicate what on the western is called a Loch. It is doubtless derived from the language of the settlers, who came from the northern parts of Europe; for it corresponds to the *fiord* of the Danes and Norwegians, and the *fiördur* of the Icelanders. It is a term properly used to indicate a narrow and deep inlet of the sea, especially in a rocky and elevated coast, and is, perhaps, preferable to the term *sound*, which is generally used for such inlets.

FRIU'LI, the most eastern province of Italy, forming part of the Venetian territory, is bounded on the north by the Carnic Alps, which divide it from the valley of the Drave in Carinthia; on the north-east by the Julian Alps, which divide it from the valley of the Save; on the north-west by an offset of the Carnic Alps, which divides it from the valley of the Piave in the province of Belluno; on the west by the province of Treviso, from which it is divided by the river Livenza; on the south, partly by the Dogado, or province of Venice, and partly by the Adriatic sea; and on the east by the government of Trieste or of Istria. The former limits between Venetian Friuli and the Austrian district of Trieste were marked by the river Isonzo, but the boundary is now placed farther west, running from Palmanova to the mouth of the Ausa, leaving out Aquileia and Grado, which make part of the circle of Istria. [AQUILEIA.] The boundaries of Italy on this side are not strongly marked by nature: the

chain of the Alps does not approach so near the sea as on the western frontiers of Genoa, and the main ridge or Julian Alps turns off to the eastward a considerable distance inland between the sources of the Isonzo and those of the Save. The valley of the Isonzo also and its tributaries present an opening into Carniola, and the coast of the Adriatic affords an easy access to Italy from Istria, Croatia, and other parts of Illyricum. Many centuries ago Paulus Diaconus and other writers had observed that Italy was most accessible to foreign armies on its eastern frontiers on the side of Illyricum and Pannonia, and this may explain, in part, why the Germans have always found greater facility than the French in maintaining a footing in the Peninsula. Accordingly this was the road by which the Goths, the Heruli, the Huns, the Longobards, and the Hungarians, successively invaded Italy.

The name of Friuli appears to be a corruption of Forum Julii Carnorum, the name of a Roman colony said to have been founded by Cæsar, now Cividal di Friuli, on the river Natiso, one of the affluents of the Isonzo, which flows along the western side of an offset of the Julian Alps which bounds Friuli to the north-east. Numerous and important remains of the Roman colony have been lately excavated by the Canon Della Torre (*Giornale Arcadico*, vol. xvii. pp. 400-11). Alboin, who entered Italy on this side, after conquering the plains of the Po, placed his nephew Gisulfus as governor or duke of Friuli. From that time Friuli formed one of the principal duchies of which the elective monarchy of the Longobards was composed. When Charlemagne overthrew that monarchy in the eight century, he left Friuli to its Longobard duke Rotogaldus, but Adelgisus the fugitive son of Desiderius having re-appeared in Italy with troops, the duke of Friuli joined him, for which he was attacked by Charlemagne, defeated and executed. Charlemagne then gave the duchy to a Frenchman of the name of Henri, adding to his government the territories of Styria and Carinthia. Henri was assassinated A.D. 799; after which several dukes followed in succession, and among others Berengarius, who obtained the crown of Italy after the extinction of the Carlovingian dynasty. Berengarius was assassinated A.D. 924. Mention is made however of subsequent dukes of Friuli till the beginning of the 11th century, when Conrad the Salic, emperor of Germany and king of Italy, gave both the duchy of Friuli and the marquisate of Istria to his chancellor Poppo, patriarch of Aquileia. Poppo's successors held Friuli as sovereign princes, though nominal feudatories of the Empire till the year 1420, when the patriarch being at war with Venice, the Venetians conquered Friuli and annexed it to their territories, leaving to the people of the towns their municipal laws and magistrates, and to the feudal lords their jurisdictions and allowing them to retain a considerable degree of independence. The county of Gorizia and the territory of Monfalcone, on the east bank of the Isonzo, belonging to the old duchy of Friuli, were given up to Austria. Friuli remained subject to Venice, till the fall of that republic in 1797; it was then ceded to Austria, by the peace of Campoformio; was afterwards annexed to the kingdom of Italy in 1806, but was reconquered by Austria with the other Venetian provinces in 1814. It now forms a province of the Lombardo-Venetian kingdom, called 'Delegazione di Udine.'

Friuli, though little visited by travellers, is a very fine and interesting part of Italy. Its length is about 60 miles from the sources of the Tagliamento to the sea, its breadth is about 45 miles, and its area about 2500 English square miles. Its population amounts to 339,000, a greater number than that of any other Venetian province. The country is watered by numerous rivers, and has considerable plains in its southern part, producing abundance of corn and very good wine, while the northern part is hilly and affords excellent pasture and plenty of game. The climate is healthy, the inhabitants are robust and spirited, and were considered as very good marksmen in the time of the Venetian rule. They speak a dialect of the Italian, different from the Venetian; on the borders however German and Sclavonian are spoken. (Da Porto, *Lettere Storiche dall anno* 1509 *al* 1512; *lettera* xxi. *descrizione della Patria del Friuli*.) For a further description of the country see UDINE, PROVINCE OF.

FROBEN, or FROBE'NIUS, JOHN, was a native of Hammelburg in Franconia, where he received his earliest education. He afterwards went to the university of Basle, and there acquired the reputation of being an eminent scholar. With the view of promoting useful learning, he applied himself to the art of printing; and becoming master of it, opened a shop in Basle, probably about 1491. He was the first of the German printers who brought the art to perfection; and one of the first who introduced into Germany the use of the Roman character. Being a man of probity and piety as well as skill, he would never suffer libels, or any thing that might hurt the reputation of another, to go through his press for the sake of profit. He thought such productions disgraceful to his art, disgraceful to letters, and pernicious to religion and society. Froben's great reputation was the principal motive which led Erasmus to fix his residence at Basle, in order to have his own books printed by him. The connection between them grew close and intimate, and was one of the sincerest cordiality. Erasmus loved the good qualities of Froben, as much as Froben admired the great ones of Erasmus.

There is an epistle of Erasmus extant, which contains so full an account of this printer, that it forms a very curious memoir for his life. It was written in 1527, on the occasion of Froben's death, which happened that year; and which, Erasmus tells us, he bore so extremely ill, that he really began to be ashamed of his grief, since what he felt upon the death of his own brother was not to be compared to it. He says, that he lamented the loss of Froben, not so much because he had a strong affection for him, but because he seemed raised up by Providence for the promoting of liberal studies. Then he proceeds to describe his good qualities, which were indeed very great and numerous: and concludes with a particular account of his death, which was somewhat remarkable. He relates, that, about five years before, Froben had the misfortune to fall from the top of a pair of stairs, on a brick pavement; which fall, though he then imagined himself not much hurt by it, was thought to have laid the foundation of his subsequent malady. The year before he died, he was seized with excruciating pains in his right ancle; but was in time so relieved from these, that he was able to go to Frankfort on horseback. The malady however, whatever it was, was not gone, but had settled in the toes of his right foot, of which he had no use. Next, a numbness seized the fingers of his right hand; and then a dead palsy, which taking him when he was reaching something from a high place, he fell with his head upon the ground, and discovered few signs of life afterwards. He died lamented by all, but by none more than Erasmus, who wrote his epitaph in Greek and Latin. Both these epitaphs are at the end of his epistle.

A large number of valuable authors were printed by Froben, with great care and accuracy; among which may be enumerated, the works of St. Jerome, 5 vols. folio, 1516, reprinted in 1520 and 1524; those of St. Cyprian, fol. 1521; Tertullian, fol. 1521, reprinted in 1525; the works of Hilary, bishop of Poictiers, fol. 1523, reprinted in 1526; St. Ambrose, 4 vols. folio, 1527. All of these were edited by Erasmus. Froben formed a design to print the Greek Fathers, which had not then been done; but death prevented him. That work, however, was carried on by his son Jerome Frobenius, and his son-in-law Nicholas Bischof, or Episcopius, who, joining in partnership, carried on the business with the same reputation, and gave very correct editions of those fathers. (Chalmers' *Biogr. Dict.*, vol. xv., p. 137; *Biogr. Universelle*, tom. xvi., p. 90; Jortin's *Life of Erasmus*, vol. i., p. 433; Erasmi *Epist.*, fol. Lugd. Bat. 1706, ep. 922—see also 917.)

FROBISHER, SIR MARTIN, an enterprising English navigator, who, as Stow informs us, was born at Doncaster, in Yorkshire, of parents in humble life, but it is not known in what year. Being brought up to the sea, he very early displayed the talents of a great navigator, and was the first Englishman who attempted to find out a north-west passage to China. He made offers for this purpose to different English merchants for fifteen years, without effect; but being at last patronized by Ambrose Dudley, earl of Warwick, and other persons of rank and fortune, he engaged a sufficient number of adventurers, and collected such sums of money as enabled him to fit himself out for his voyage. The ships which he provided were only three; namely, two barks of about twenty-five tons each, called the Gabriel and the Michael, and a pinnace of ten tons. With these he sailed from Deptford, June 8th, 1576; and the court being then at Greenwich, the queen beheld them as they passed by, 'commended them, and bade them farewell, with shaking her hand at them out of the window.' Bending their course northward, they came on the 24th within sight of Fara, one

of the islands of Shetland; and on the 11th July discovered Freeseland, bearing W.N.W., which stood high, and was covered with snow. They could not land by reason of the ice, and great depth of water near the shore. The east point of this island Capt. Frobisher named 'Queen Elizabeth's Foreland.' On the 28th they had sight of Meta Incognita, being part of New Greenland, on which also they could not land, for the reasons just mentioned. Aug. 10th Frobisher went on a desert island, three miles from the continent, but staid there only a few hours. The next day he entered into a strait which he called, and it still retains the name of Frobisher's Strait. On the 12th, sailing to Gabriel's island, they came to a sound, which they named Prior's Sound, and anchored in a sandy bay there. On the 15th they sailed to Prior's bay; the 17th to Thomas Williams's island, and the 18th came to anchor under Burcher's island. Here they went on shore, and had some communication with the natives, by whose treachery they lost a boat and five of their men. Frobisher having endeavoured in vain to recover his men, set sail again for England the 26th August; came again within sight of Freeseland 1st September; and notwithstanding a terrible storm on the 7th of the same month, he arrived at Harwich on the 2nd of October.

Frobisher took possession of the country he had landed upon in queen Elizabeth's name, and, in token of such possession, ordered his men to bring to him whatever they could first find. One among the rest brought a piece of black stone, in appearance like sea-coal, but very heavy. Having at his return distributed fragments of it among his friends, the wife of one of the adventurers threw a fragment into the fire, which being taken out again, and quenched in vinegar, glittered like gold; and being tried by some refiners in London, was found to contain a portion of that rich metal. This circumstance raising prodigious expectations of gold, great numbers of persons earnestly pressed, and soon fitted out Capt. Frobisher for a second voyage, to be undertaken in the following spring. The queen lent him a ship of the royal navy, of two hundred tons, with which, and two small barks, of about thirty tons each, he fell down to Gravesend, May 26th, 1577, where the minister of the parish came aboard the greater ship, the Aid, and administered the sacrament to the company. Two days after they reached Harwich, whence they sailed on the 31st May.

The whole complement of gentlemen, soldiers, sailors, merchants, miners, &c., who accompanied the expedition, was a hundred and forty, furnished with victuals and all other necessaries for seven months. They arrived in St. Magnus Sound, at the Orkney islands, upon the 7th of June, whence they kept their course for the space of twenty-six days, without seeing land. They met, however, with great drifts of wood, and whole bodies of trees, which they imagined to come from the coast of Newfoundland. On the 4th of July they discovered Freeseland, along the coasts of which they found islands of ice, of incredible bigness, some being seventy or eighty fathoms under water, and more than half a mile in circuit. Not having been able safely to land in this place, they proceeded to Frobisher's Strait; and on the 17th of the same month made the north foreland in it, otherwise called Hall's island, as also a smaller island of the same name, where they had in their previous voyage found the ore, but could not now get a piece as large as a walnut. They met with some of it, however, in other adjacent islands. On the 19th they went upon Hall's greater island to discover the country, and the nature of the inhabitants, with some of whom they trafficked, and took one of them, neither in a very just nor handsome manner; and upon a hill here they erected a column of stones, which they called Mount Warwick. They now sailed about, to make what discoveries they could, and gave names to different bays and islands; as Jackman's Sound, Smith's Island, Beare's Sound, Leicester's Isle, York's Sound, Ann countess of Warwick's Sound and Island, &c.

Frobisher's instructions for this voyage were principally to search for ore in this neighbourhood; he was directed to leave the further discovery of the North-west passage till another time. Having therefore in the countess of Warwick's island found a good quantity, he took a lading of it. He set sail the 23rd of August, and arrived in England about the end of September. He was most graciously received by the queen; and as the gold ore he brought had an appearance of riches and profit, and the hope of a North-west passage to China was greatly increased by this second voyage, her majesty appointed commissioners to make trial of the ore, and examine thoroughly into the whole affair The commissioners did so, and reported the great value of the undertaking, and the expediency of farther carrying on the discovery of the North-west passage. Upon this, suitable preparations were made with all possible despatch; and because the mines newly found out were sufficient to defray the adventurers' charges, it was thought necessary to send a select number of soldiers, to secure the places already discovered, to make farther discoveries into the inland parts, and to search again for the passage to China. Besides three ships, as before, twelve others were fitted out for this voyage, which were to return at the end of the following summer, with a lading of gold ore. They assembled at Harwich, 27th May, 1578, and sailing thence the 31st, they came within sight of Freeseland on the 20th June, when Frobisher, who was now called lieutenant-general, took possession of the country in the queen of England's name, and called it West England, giving the name of Charing Cross to one of the high cliffs. On July 4th, they came within the mouth of Frobisher's Strait, but being obstructed by the ice, which sank one of their barks, and driven out to sea by a storm, they were so unfortunate as not to hit the entrance of it again. Instead of which, being deceived by a current from the north-east, and remaining twenty days in a continual fog, they ran sixty leagues into other unknown straits before they discovered their mistake. Frobisher, however, coming back again, made for the strait which bore his name; and on the 23rd July, at a place within it, called Hatton's Headland, found seven ships of his fleet. On the 31st of the same month, he recovered his long-desired port, and came to anchor in the Countess of Warwick's Sound; but the season of the year being too advanced to undertake discoveries, after getting as much ore as he could, he sailed with his fleet for England, where, after a stormy and dangerous voyage, he arrived in the beginning of October.

We have no account how Frobisher employed himself from this time to 1585, when he commanded the Aid, in sir Francis Drake's expedition to the West Indies. In 1588 he commanded the Triumph, and exerted himself very bravely against the Spanish armada on July the 26th, in which year he received the honour of knighthood, on board his own ship, from the lord-high-admiral, for his valour. In 1590 he commanded one of two squadrons upon the Spanish coast. In 1594 he was sent, with four men-of-war, to the assistance of Henry IV. of France, against a body of the leaguers and Spaniards, then in possession of part of Britany, who had fortified themselves very strongly at Croyzon, near Brest. Here, in an assault upon that fort, on Nov. 7th, he was wounded by a ball in the hip, of which he died soon after he had brought the fleet safely back to Plymouth, and was buried in that town. Stow says, the wound was not mortal in itself, but became so through the negligence of his surgeon, who only extracted the bullet, without duly searching the wound, and taking out the wadding, which caused it to fester. (Hakluyt's *Collect. of Voyages*, vol. iii. pp. 29, 32, 39; Stow's *Annales*, edit. 1631, p. 109; *Biogr. Brit.* vol. iii. p. 2044.) There is a good portrait of Sir Martin Frobisher in the picture gallery at Oxford; and many of his letters and papers, with others relating to him, are preserved in the Cottonian and Harleian collections of manuscripts in the British Museum. The instructions given to him for the voyage of 1577 are printed in the Archæologia, vol. xviii. p. 287, from one of Sir Hans Sloane's MSS. His last letter, reporting the taking of the fort of Croyzon, dated Nov. 8th, 1594, is preserved in the Cottonian MS., Calig. E. ix. fol. 211. A Latin translation of the account of his voyage of 1577, under the title of *Historia Navigationis Martini Forbisseri*, by Joh. Tho. Freigius, was published at Hamburg, in 4to. 1675.

FRODSHAM. [CHESHIRE.]

FROGS, FROG-TRIBE. Terms applied by zoologists to a natural section of the *Batrachians*, Cuvier's fourth order of Reptiles.

The Batrachians differ essentially from the other three orders, viz.: *Chelonians* or Tortoises, *Saurians* or Lizards, and *Ophidians* or Serpents. They have no ribs, or rudiments of ribs only. Their skin is naked, being without scales; they have feet. The male has no external organ of generation, and there is consequently no intromissive coïtus. In the Frog-tribe the ova are fecundated on their exclusion from the body of the female: they are shelless and generally laid in the water. The young, when hatched, breathe by means of

branchiæ or gills, very much after the manner of fishes, being in their early stage of growth quite unlike their parents, and, in that state, forming a natural passage to the last-named class of animals. These branchiæ disappear as the higher Batrachian proceeds towards maturity, and the order has therefore been named the *Caducibranchiate Amphibia*,* which have been divided into, 1st, the *Anurous* or *Tailless Batrachians*, having no tails except in their young state, including the frogs and toads; and 2nd, the *Urodeles* or *Tailed Batrachians*, such as the *Salamanders* [SALAMANDER]. The first-named branch will form the subject of the present article; and, among these animals, the transformations of the young (which undergo a complete metamorphosis in the greater part of their organs, and an entire change in their habits and mode of life) are most distinctly manifested.

ORGANIZATION.

Skeleton.—The skull, in the reptiles, generally, is made up of the same parts nearly, as that of the mammiferous animals, though the proportions are different. But the lower Batrachians, which approach the fishes in this particular, have not the internal cavity corresponding so completely with the surface of the encephalon as the other reptiles. The skull is very much flattened; and small as the cerebral cavity is, it is by no means filled with the brain. It is narrower and more elongated in the species which pass their whole lives in the water than it is in the Anurous Batrachians or True Frogs.

The vertebral column commences at the posterior part of the head, and, unlike the rest of the reptiles, the Batrachians, like the Rays, the sharks, and the mammiferous animals, possess two condyles situated on the sides of the vertebral hole. In the tadpole the vertebræ are of the same calibre throughout, but a difference takes place when the limbs are developed. At this period, the vertebral canal diminishes gradually in length, the spinal marrow contracts and no trace of the canal is left in the elongated coccyx. It is in the tailless Batrachians that the vertebral column is shortest, for the frogs have only ten and the pipas but eight vertebræ.

As a general rule, the anterior extremities are shorter than the posterior limbs; but in some of the frogs, especially, the lower extremities are twice or thrice as long as the anterior feet, as might be expected in animals whose progression is principally effected by leaps. Ribs there are none; but the sternum is highly developed and a large portion is very often cartilaginous. It receives anteriorly, or in its mesial portion, the two clavicles and two coracoids which fit on to the *scapula*. The whole makes a sort of band which sustains the anterior extremities, and an elongated disk which forms a support for the throat, and assists in the offices of deglutition and respiration. Another disk extending backwards, being for the insertion of the recti muscles, protects the abdominal viscera in some species. The pelvis is well developed in the frogs, especially in the Pipa, and though apparently deprived of all traces of a tail after undergoing their last transformation, there remains, internally, a true coccygeal piece, most frequently even moveable, and elongated, but without anything like vertebral form.

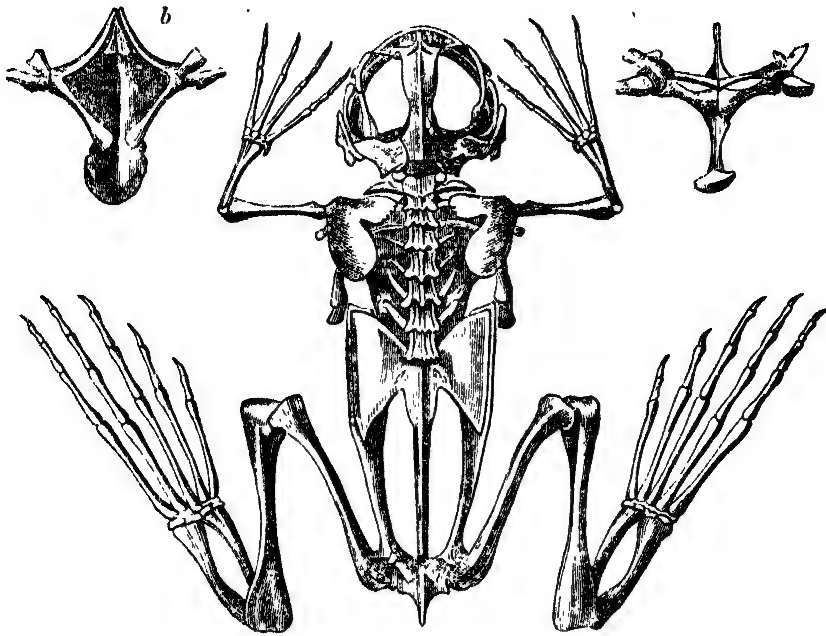
The bone of the arm or *humerus* is single, and is long in proportion to those of the fore-arm, which are united throughout their length, their duality being manifested by a simple furrow or depression. These bones are distinct in the reptiles generally, and the radius is generally rather the longest; the ulna is prolonged backwards into a kind of *olecranon*, and sometimes this apophysis is distinct, and becomes a sort of sesamoïd-bone in the thick part of the tendon of the extensor muscles. The pipas, the tortoises, and the greater part of the saurians have this conformation. The bones of the *carpus* or Wrist exhibit nothing extraordinary in their structure; nor do those of the fingers, which are without nails or claws, require particular notice.

The bones of the well-developed *pelvis* present considerable differences in the various genera of Anurous Batrachians. Thus in the Frogs (*Rana*) and the Tree Frogs (*Hyla*), the *ossa ilii* are very much elongated, articulated in a moveable manner on the *sacrum*, and very much approximated below towards the cotyloid cavity; so that the two heads of the thigh-bones seem to be placed in contact, a conformation which much influences the action of the posterior limbs upon the trunk in the execution of the motions of swimming and leaping. In the *Pipa*, or *Surinam Toad*, the *ossa ilii* are very much widened at the point of junction with the *sacrum*, which is, itself, dilated, forming a strong union by means of a true symphysis. The *femur*, or thigh-bone, is very much elongated, and slightly curved in the form of the letter S in the Frogs (*Rana*), and in the Tree Frogs (*Hyla*); it is a little shorter in the Toads (*Bufo*), and is flattened in the *Pipa*. The bones of the leg (*tibia* and *fibula*) are, in the Reptiles, generally distinct; but in the Anurous Batrachians, *Rana*, *Hyla*, and *Pipa*, for instance, they are so soldered together as to form but a single articulation with the *femur* and *tarsus*, and to present the appearance of a single very much elongated bone, which some have erroneously considered as a supernumerary bone, or second *femur*. The knee-joint and articulating bones are so disposed that the feet have always a direction outwards. In the Reptiles, generally, the posterior feet are more developed than the anterior limbs; and this modification is particularly observable in the Anurous Batrachians, which have the *tarsus* so much elongated as to induce some to consider the first bones composing it to be a *fibula* or *tibia*. The bones of the *metatarsus* correspond to the number of toes.



Skeleton of the Common Frog.

* The *Axolotl* (see the title) is an example of the *Perennibranchiate Amphibia*.



Skeleton of Dactylethra Lalandii.

The figures on each side show the difference of the sternum in the Common Frog, and in the Dactylethra; *a* represents the sternum of the former; *b* that of the latter.

Muscular system, particularly as relating to locomotion.—The muscles destined to give activity to the framework, examples of which are given above, are, like those of all the Reptiles, remarkable for their irritability. There are not wanting zoologists who have seen Toads, Salamanders, Tortoises, and Serpents, deprived of their heads and skins, but kept moist, display muscular motion for whole weeks. In the Anurous Batrachians, the Frogs especially, the muscles of the abdomen are more developed than in the other Reptiles, offering in this particular some analogy to the abdominal structure of the Mammifers. But it is in the disposition of the muscles of the thigh and leg in the Frogs and other Anurous Batrachians, that the greatest singularity is manifested. These, whether taken conjointly or singly, present the greatest analogy with the muscular arrangement of the same parts in Man. We find the rounded, elongated, conical thigh, the knee extending itself in the same direction with the thigh-bone, and a well-fashioned calf to the leg, formed by the belly of the *gastrocnemii* muscles. It is impossible to watch the horizontal motions of a frog in the water, as it is impelled by these muscles and its webbed feet, without being struck with the complete resemblance in this portion of its frame to human conformation, and the almost perfect identity of the movements of its lower extremities with those of a man making the same efforts in the same situation.

We have seen that the ribs are absent in the Anurous Batrachians, and the functions of respiration, as well as those of deglutition, being carried on by means of particular muscles, as we shall presently have to notice, those bones would have been mere incumbrances. In the *Frogs*, the muscles are not attached to the skin, which envelops the whole muscular arrangement in a sort of insulated, insensible, moveable bag: in the *Urodeles*, on the contrary, the integuments serve as the point of insertion to almost all the active organs of motion.

The locomotion of the Anurous Batrachians on land consists in walking, running, and leaping, in its various modifications; the latter being the motion most prevalent. The greater part of them are excellent swimmers; and when they betake themselves to this exercise, the body is extended horizontally, and the animal is propelled by the mechanism of the lower extremities alone, a mechanism admirably adapted to this mode of progression, as well as to the other varieties of movement which the necessities of the animal require. By the aid of these well-developed lower limbs, and the prodigious power of their muscular and bony levers, a frog can raise itself in the air to twenty times its own height, and traverse, at a single bound, a space more than fifty times the length of its own body.

Digestive Organs.—The Anurous Batrachians, in their adult state, are, like the greater part of the existing Reptiles, carnivorous, and swallow their living prey without mastication. The mouth in many of them is very wide; so wide, indeed, in some (the large Frogs and Pipas, for instance), as to admit of their swallowing vertebrated animals: but insects, annelids, and small mollusks form the chief of their food. They have no true fleshy lips, nor indeed have any of the Reptiles; but the freshwater tortoises are furnished with folds of skin as a covering for their cutting jaws, and perhaps as a more complete apparatus for shutting the mouth. The same conformation is observable in the greater number of the tadpoles of the Batrachians, the larger portion of which, in their adult state, have the lower jaw received under a soft skin which covers and edges the mandible. The branches of the lower maxillary bone are rarely soldered at the symphysis, and sometimes, as in the genera *Rana* and *Hyla*, there is, at the point of junction, a mere cartilage which admits of a certain amount of motion. In the *Frogs* and the *Urodeles*, the number of pieces composing each of the branches amounts to three. One of these pieces corresponds with the symphysis, and is armed with teeth, the second serves for articulation, and the third is situated backwards, and prolonged below. On the palate of many of the Anurous Batrachians are certain processes which may be termed teeth; but these are pointed, and not tubercular, as the old error of naming some of the teeth of fossil fishes *Bufonites* might lead us to suppose. These palatal teeth form a part of the bones to which they are attached, as in the case of fishes.

The tongue performs a leading part in the capture and deglutition of the prey. In the greater portion of the Anurous Batrachians the structure of this organ is altogether anomalous, and its insertion is equally at variance with the mode adopted in the other vertebrated animals. It is very soft, fleshy almost throughout, and is not supported at its base by an *os hyoides*. Its attachment is the reverse of that generally seen, for it is fixed in the concavity which is formed by the approach of the two branches of the lower jaw towards the symphysis. In a state of repose, and when the mouth is shut, this tongue, which has its root, so to speak, in the interior edge of the anterior part of the lower jaw, has its free extremity in the back part of the mouth and before the aperture of the air-passages; but when the animal puts it forth, it is considerably elongated and thrown sharply out of the mouth, as if by an effort of expuition. The end reaches to a considerable distance, as, turning on the pivot of its anterior fixure, it is reversed in such a manner that the surface which was below when the tongue was in the mouth, and in a state of repose, is, when

it is thrown out, above; and, when the tongue is returned into the mouth, the surface, which was an instant before above, resumes its original position, and is again beneath. The organ is armed with a tenacious viscous secretion; and when it touches the prey, the latter adheres so firmly to it, that it is carried back with the tongue into the mouth. There it is, in most cases, compressed, involved again in a glutinous sort of saliva, and almost instantly submitted to the act of deglutition. The motion of throwing out and returning the tongue is often performed with a rapidity which the eye can hardly follow. If any one will observe a toad in a melon-frame, he will see the ants or other insects which come within shot of its tongue disappear; but his vision must be very acute and prompt to detect the action of the tongue. The muscles, whose office it is to move the bones, cartilages, and other parts of the mouth, act more especially upon the lower jaw, upon the bone of the mandible, and upon the tongue, which, after being shot forth as we have endeavoured to describe, is returned and swallowed, as it were, with the captured prey, and the act of deglutition is continued till the food is lodged in the stomach.

The *pharynx* in mammiferous animals consists of that backward cavity of the throat into which the lower orifices of the nostrils, the orifice of the mouth, the canal of the ear, the *larynx* and the *œsophagus* open: but in the Reptiles there cannot be said to be any true *pharynx*, for the nostrils, as well as the *glottis*, open into the mouth, the œsophagus commences immediately behind the nostrils, and the muscles that act more especially upon these parts and upon the tongue are those that begin the act of deglutition; we shall presently see that these same muscles are also put in requisition to force the air necessary for respiration into the *glottis* and *trachea*, in order to supply the cavity of the lungs. The stomach of the Anurous Batrachians does not require any particular notice; but the maxim that the more carnivorous an animal is, the shorter and the less flexuous is its intestinal canal, is well illustrated in that tribe. The tadpole, which lives upon vegetables, possesses an extremely long digestive tube; but in its perfect state, and when its appetite has become altogether carnivorous, the intestines become very much shortened, losing four-fifths of the length which distinguished them when the animal was in its early stage of existence. The vent in the Anurous Batrachians is rounded and wrinkled. The liver generally consists of three lobes, and the gall-bladder adheres to and is hidden in the concavity of the liver, very high up. The spleen in the frog and toad is rounded, not of large dimensions, and situated in the mesial region, under the intermediate lobe of the liver. There is also a pancreas, and the chyliferous veins may be distinctly traced. Thus far we have endeavoured to give a mere outline of the digestive organs in the Anurous Batrachians, in their perfect state: but these organs, as might be expected, vary considerably in the tadpole. In this early stage, they have a mouth furnished with lips, and horny cutting processes, that act as jaws in the division of the vegetable food, which forms their principal nourishment, and their intestinal canal is coiled spirally within their large rounded abdomen. The metamorphosis is complete, internally as well as externally, when this armed little mouth is changed into the widely-opening gape, which reaches beyond the eyes, and the animal swallows its living prey entire. In this their last stage, they can endure a long abstinence; they grow slowly, and they live to a considerable age. The soft skin which edges their jaws is soft, and forms a sort of gum or external lip; their under-jaw is received into a kind of rim or groove, which runs along the upper-jaw, and its two branches are slightly moveable towards the symphysis: this junction of the jaws is as complete as the shutting of the well-fitted lid of a snuff-box. The tongue, as we have seen, adheres in the adults to the anterior part of the gums: but this must be taken as a general rule, to which there is, at least, one exception; for, in *Dactylethra* (Voigt), which has no externally visible ear-drum, the tongue is fastened to the back of the mouth; and in *Pipa*, the tongue is wanting.

The *œsophagus* is a large thin canal, with longitudinal folds, and may be considered as a kind of crop or first stomach; and the intestinal canal is hardly 1½ the length of the whole body, whilst in the tadpole it is more than seven times as long. We must not omit to notice here the remarkable folds of the *peritoneum*, in the thickness of which folds a fatty matter is either deposited or secreted, generally of a yellow colour, and varying much with regard to its disposition in the different species: the use of this substance is supposed to be a provision for the support of the animal during the period of its lethargic hybernation in the cold months.

In the museum of the Royal College of Surgeons, there is a preparation (No. 669, Gallery, Physiological Series), showing a portion of the small and great intestine of a frog (*Rana temporaria* of Linnæus), injected, exhibiting the peculiar reflected course of the former, and its oblique termination in the latter, which is suddenly dilated.

Circulating System.—The circulation in the Anurous Batrachians varies with the different metamorphoses which the animal undergoes. In the early or tadpole stage, the whole of the blood is driven by the heart into the branchial vessels, the circulation at that period being the same as it is in fishes. The *apparently* single auricle (for according to the observations of Dr. Davy and of MM. Saint Ange and Wébert, it is in fact separated into two divisions), or rather the partition which exists at the point where the oxygenated blood arrives through the pulmonary veins, can hardly be said to be distinct, and the venous blood, which is poured into it by the large *vena cava*, penetrates finally into the single ventricle, which contracting, pushes the blood into the single arterial trunk, which is furnished at its base, near the valvules, with a sort of bulb, or contractile swelling. This artery, which contains the black or venous blood, is divided into two trunks, one directed to the right, the other to the left, and these are then subdivided into two, three, or four branches, according to the number of the branchial leaflets: on their arrival there, they inosculate with the venous trunks, and by that time the blood has assumed its arterial quality and colour. These arterial veins unite successively, so as to form, by means of two principal trunks, the origin of one great artery or *aorta descendens*, which is, at the point of its formation, placed near the head, to which it gives off many branches, and continues to descend down the vertebral column.

But when the time of metamorphosis arrives, and when the animal which had been breathing by means of gills is to respire through the medium of lungs, an entire and necessary change takes place. In proportion as the *branchiæ* of the tadpole are destroyed and absorbed, the calibre of the venous arteries, which were distributed to them, diminishes gradually, till they are at last entirely obliterated. The first of these vessels then develops itself, and receives on each side the whole of the blood, giving off three principal trunks, —one for the head, corresponding to the carotid artery—one for the anterior limbs, or a brachial artery—and one, the longest of all, for the cellular lung, which is of considerable volume. The rest of the principal trunk follows the mesial line, and unites with its congener, so as to form a true *aorta* for the supply of the viscera and lower extremities, which acquire their large dimensions at this period.

Respiratory System and *Vocal Organs.*—The absence of the ribs prevents any application of costal influence upon the respiratory organs of the Anurous Batrachians, as is the case with the mammiferous animals: but though their form, as well as the medium in which they live, is so totally different in the early and late part of their life, the principal of action on these organs is nearly the same. The young may be said to swallow water, or at least to receive it into the cavity of the mouth, before they force it into the branchial vessels; and though the mode of breathing is so entirely changed in after-life, the operation consists in the perfect animal of a succession of deglutitions of air.

When the Batrachian leaves the egg, its *branchiæ* appear externally, like little coloured fringes on each side of the neck, and so they remain in the Urodeles, as long as their lungs are not sufficiently developed to serve for complete respiration. But in the Frogs and other Anurous Batrachians, the first stage of the animal's life endures but a short time. It soon assumes the tadpole form, with an enormous belly and head, in one undistinguished outline, and a long tail. At this period the branchiæ, or gills, are hidden, being contained in a cavity, and then the water enters the mouth by the orifice of the nostrils, which are supplied with valves. When in the cavity of the mouth, which is well closed on all sides, with the exception of the throat, where are placed the branchial slits, the water, acted upon by the muscles which cover them, traverses these

spaces, and bathes the branchiæ before its exit through the branchial holes. The blood which is pushed into these branchiæ is then distributed, as it is in the fishes, and passes, as we have seen, from the arterial venous vessels into the arteries which unite to form the aorta.

On acquiring their perfect form, and when the obliteration of certain points, and the development of the others, have adapted the Anurous Batrachian for breathing air, by means of its two large lungs, the muscles employed in deglutition are the great agents for carrying on the respiration. The anterior nostrils, as we have before stated, open nearly straight, by means of simple apertures in front of the palate; the tongue is applied as a kind of stopper upon the back nostrils, and the trachea is terminated by a glottis opening into the mouth. The air thus imprisoned, is forced or pumped at each gulp through the glottis, to be distributed over the lungs.

In the museum of the Royal College of Surgeons, are the following preparations, illustrative of the aëration of the blood, by means of branchiæ, in the early stage of *Rana paradoxa*. No. 1067 is a larva, with the cavity of the mouth laid open to show the branchial and laryngeal orifices: the abdomen is also exposed, to show the rudimentary lungs *in situ*, with bristles placed in them. No. 1068 is the head of another larva of the same species, exhibiting on one side the branchial and laryngeal apertures, and on the opposite side the three series of tufted branchiæ, projecting from the membranous arches, and exposed by the reflection of the opercular fold of membrane. No. 1069 shows the lungs of the larva of the same species, and a bristle is passed from the laryngeal aperture directly into the right lung, there being no intervening trachea.

The following are illustrative of the mode of respiration in the adult Anurous Batrachians. No. 1098 exhibits a Frog (*Rana temporaria*, Linn.), with the lungs injected *in situ*. The left lung is laid open to show the cellular parietes, and the extent to which they encroach upon the cavity of the lung. No. 1099 is a single lung of the Frog, injected and laid open; and 1100, a single lung of a Toad (*Bufo vulgaris*, Linn.): it will be observed that the parietes, like those of the Frog, are cellular, but thinner. No. 1101 shows the lungs of a large Batrachian, one of them laid open, and exhibiting a more minutely cellular structure than the preceding. No. 1102 is a preparation of the lungs and larynx of a Bull-frog (*Rana pipiens*, Linn.), and a small accessory pouch will be seen appended to each pulmonary sac. A Surinam Toad (*Pipa monstrosa*, Linn.), is numbered 1103. The ventral parietes of the abdomen are reflected to show the thin membranous lungs *in situ*: they are of considerable breadth, and extend downwards to the pelvis, as in the Chelonian Reptiles. The lower portion of one of the lungs is preserved in the bottle No. 1104, and shows its large cells, and their dense and slightly vascular parietes, being adapted at that part to serve as a reservoir of air.

The activity of respiration is increased in proportion to the elevation of the temperature of the surrounding air. M. Delaroche found that frogs exposed to a temperature of 27° (centigrade) absorbed four times as much oxygen as those submitted to a temperature of 6° or 7° only.

The organs of the voice in the Anurous Batrachians are only put in action, generally speaking, at the season of reproduction, and then principally by the males: their croakings and cries seem intended to make the one sex sensible of the presence of the other. The *trachea* is, indeed, very short in the frog; but it is longer in the male than it is in the female, and the *rima glottidis* is also longer in the former. But, in some frogs, the males are distinguished by peculiar membranous bags. Thus, the Green Frog has two cheek pouches, which are inflated by the animal in the breeding season, by means of two apertures close to the *rima glottidis*; and the *chordæ vocales* are very large and distinct in many species. The glottis bears, apparently, considerable analogy to the upper larynx in Birds; but in the birds, the voice receives its modification only from the edges of the glottis, which shuts the trachea at the point where it opens into the mouth; the sounds being produced by the lower larynx, which is formed at the point of junction of the two branches which constitute the origin of the trachea. When the air-passages of the Reptiles emit sounds, they are produced by the single larynx and the glottis: from the absence of moveable lips, and the *velum palati*, or their inconsiderable development, those sounds cannot be much modified. Nevertheless, the vocal powers of the species of Anurous Batrachians vary very much, according to the varying mechanism manifested in each. The cries of the different species of *Rana*, from the well known croaking of the *common Frog* to the bellowing of the *Bull Frog*; the shrill trebles of the species of *Hyla*, of the males especially; the flute-like and metallic sounds occasionally given out, and the sort of seemingly ventriloquous grumbling which some species of Toads exert, are vocal sounds emitted above the larynx—a sort of falsetto or *voce di testa*—from the buccal cavity, or some of the accessory sacs.

As connected with the phænomena of breathing, it must not be forgotten that the naked skin of the Frogs, and indeed of the Batrachians generally, has the power of acting upon the air in such a way as to fulfil, in a great degree, the functions of the lungs, and that aërated water may be made subservient to this cutaneous respiration. The experiments made on Frogs which have been kept in vessels, and under water charged with air renewed from time to time, and on Toads which have been kept alive for months in nets sunk under running water, at a low temperature, without any direct access to atmospheric air, prove this. These powers, the faculty of enduring long abstinence, their hybernation, and the age* to which the Anurous Batrachians are said to attain, naturally lead us to the consideration of the stories told of the discovery of toads, 'antediluvian toads' as they were once called, inclosed in solid rocks and in the heart of trees, where they had been supposed to have existed for centuries, deprived of the possibility of access to either food or air; though, when found, they were alive and vigorous. Nor do these stories rest solely on the doubtful hearsay evidence of uneducated persons. Thus Smellie, in his 'Philosophy of Natural History,' alludes to the account in the 'Memoirs of the Academy of Sciences' for the year 1719, of a toad found alive and healthy in the heart of an old elm; and of another discovered in the year 1731, near Nantz, in the heart of an old oak, without any visible entrance to its habitation. From the size of the tree, it was concluded that the animal must have been confined in that situation at least eighty or a hundred years. He adds, that, in the many examples of toads found in solid rocks, exact impressions of their bodies, corresponding to their respective sizes, were uniformly left in the stones or trees from which they were dislodged; and he asserts that it was said that there existed, when he wrote, a marble chimney-piece at Chatsworth with a print of a toad in it; and that there was a traditionary account of the place and manner in which it was found.

'These and similar facts,' adds the author last above quoted, 'are supported by authorities so numerous and so respectable, that it is unnecessary to quote them. Many abortive attempts have been made to account for an animal's growing and living very long in the situations above described, without the possibility of receiving nourishment or air; especially as, like all other animals, when put into an exhausted receiver, the toad soon loses its existence. Upon this subject I shall only hazard two observations. The toad, it is well known, when kept in a damp place, can live several months without food of any kind; though, in its state of natural liberty, it devours voraciously spiders, maggots, ants, and other insects. Here we have an instance, and there are many, of an animal whose constitution is so framed by nature, that it can exist several months without receiving any portion of food. According to our ideas of the necessity of frequent supplies of nourishment, it is nearly as difficult for us to conceive an abstinence of four or six months as one of as many years, or even centuries. The one fact, therefore, may be as readily admitted as the other. The same remark is equally applicable to the regular respiration of air. The toad, and many other animals, from some peculiarity in their constitution, can live very long in a torpid state without seeming to respire, and yet their principle of life is not entirely extinguished. Hence the toad may, and actually does, live many years in situations which exclude a free intercourse with the external air. Besides, almost all the above, and similar facts, must, from their nature, have been discovered by common labourers, who are totally unqualified for ex-

* The age which the Anurous Batrachians may reach seems to be great. Mr. Arscott remembered the pet toad, which had been long kept in his family, for thirty-six years; and, when he was first acquainted with it, his father used to mention it as the 'old toad.' The animal was supposed to have died at last in consequence of an injury which it received from a tame raven.

amining every circumstance with the discerning eye of a philosopher. In rocks there are many chinks as well as fissures, both horizontal and perpendicular; and in old trees nothing is more frequent than holes and vacuities of different dimensions. Through these fissures and vacuities the eggs of toads may accidentally be conveyed by water, the penetration of which few substances are capable of resisting. After the eggs are hatched, the animals may receive moisture and small portions of air through the crevices of rocks, or the channels of aged trees. But I mean not to persuade, for I cannot satisfy myself. All I intend is, to recommend to those gentlemen who may hereafter chance to see such rare phenomena, a strict examination of every circumstance that can throw light upon a subject so dark and mysterious; for the vulgar, ever inclined to render uncommon appearances still more marvellous, are not to be trusted.'

Upon the above observations it will only be necessary to remark, that the general impression on the mind of the writer seems to have been against the alleged discoveries, whilst the reasoning which he puts forth in its favour is, to say the least, very vulnerable, and in some points at variance with itself. It is difficult, indeed, to assign limits to suspended animation; but it is very improbable that where, as we have seen, it is probable that nature has made a provision for the ordinary period of hybernation, the animal should continue to exist for many years after the supply must have become exhausted. The theory of the conveyance of eggs by water is very feeble, and its extreme improbability will be manifest to those who will consider for a moment the mode of reproduction, and the metamorphoses which the creature undergoes. With regard to positive assertion, we could adduce many instances to show the careless way in which people—aye, even well-educated people—will relate as facts those appearances which they think they have seen. We once heard a person, of no mean attainment in one branch of Natural Philosophy, but no zoologist, give an account of a zoological phenomenon which we had witnessed, and had our reasons for watching narrowly. His statement was, in some points, entirely the reverse of the truth; and yet he did not intend to deceive: but his mind being filled with foregone conclusions, and his observation —if observation it might be called—being inaccurate, the result was error, which he was unconsciously disseminating.

That frogs, toads, snakes, and lizards 'occasionally issue from stones that are broken in a quarry, or in sinking wells, and sometimes even from strata of coal, at the bottom of a coal-mine,' may be readily admitted; but, as Dr. Buckland well observes, in the paper recording his experiments on this subject—and to these we shall presently allude—'the evidence is never perfect to show that the reptiles were entirely enclosed in a solid rock; no examination is ever made until the reptile is first discovered by the breaking of the mass in which it was contained, and then it is too late to ascertain, without carefully replacing every fragment (and in no case that I have seen reported has this ever been done), whether or not there was any hole or crevice by which the animal may have entered the cavity from which it was extracted. Without previous examination, it is almost impossible to prove that there was no such communication. In the case of rocks near the surface of the earth, and in stone quarries, reptiles find ready admission to holes and fissures. We have a notorious example of this kind in the lizard found alive in a chalk-pit, and brought alive to the late Dr. Clarke.' The same author remarks, that the first effort of the young toad, as soon as it has left its tadpole state, and emerged from the water, is to seek shelter in holes and crevices of rocks and trees. 'An individual, which when young may have thus entered a cavity by some very narrow aperture, would find abundance of food by catching insects, which like itself seek shelter within such cavities, and may have soon increased so much in bulk as to render it impossible to go out again through the narrow aperture at which it entered. A small hole of this kind is very likely to be overlooked by common workmen, who are the only people whose operations on wood and stone disclose cavities in the interior of such substances.'

Without, then, attempting to throw discredit upon the observations published upon this curious subject by authors whose character for veracity is unquestionable,—those of Guettard, in 1771*, of Edwards, 1824†, and of Mr. Thomas, in Silliman's Journal, in addition to those above alluded to for example,—we may conclude with Dr. Buckland, in his remarks on the last publication, that the several authentic and well-attested cases to be found in such memoirs, 'amount to no more than a repetition of the facts so often stated and admitted to be true, viz., that reptiles occur in cavities of stone, and at the depth of many feet in soil and earth; but they state not anything to disprove the possibility of a small aperture by which these cavities may have had communication with the external surface, and insects have been admitted. The attention of the discoverer is always directed more to the toad, than to the minutiæ of the state of the cavity in which it was contained.'

Dr. Buckland commenced his experiments in November, 1825. He caused twelve circular cells to be prepared in a large block of coarse oolitic limestone, from Heddington quarry, near Oxford. Each cell was about one foot deep, and five inches in diameter, and had a groove or shoulder at its upper margin, fitted to receive a circular plate of glass, and a circular slate to protect the glass; the margin of this double cover was closed round, and rendered impenetrable to air and water, by a luting of soft clay. Another block of compact siliceous sandstone (Pennant grit, of the Bristol coal formation), was made to contain twelve smaller cells, each six inches deep and five inches in diameter, and each under the same double cover as the first-mentioned cells. A live toad was placed in each of these twenty-four cells on the 26th Nov., 1825, and the double cover of glass and slate was placed over each of them, and cemented down by a luting of clay. Dr. Daubeny and Mr. Dillwyn, who were present, ascertained and noted the weight of each toad (they had all been imprisoned together in a cucumber frame, some of them for two months previously), as it was immured. The largest weighed 1185 grains; the smallest 115 grains; and they were distributed equally, small and large, among the limestone and sandstone cells. The blocks were buried in the earth of Dr. Buckland's garden, three feet deep. On the 10th of December, 1826, these blocks, which had remained unopened from the period of their inhumation, were examined. Every toad in the smaller cells of the sandstone block was dead, and so much decayed, that they must have been dead for some months. The greater part of those in the larger cells of the oolitic block were alive. No. 1, which weighed when placed in its cell 924 grains, was reduced to 698 grains. No. 5, whose weight at the same period was 1185 grains, had increased, it is asserted, to 1265 grains. Dr. Buckland observes, that the glass cover over this toad's cell was slightly cracked, so that minute insects might have entered; but none were discovered therein. In another cell, the glass of which was broken, and its tenant dead, there was a large assemblage of minute insects; and a similar assemblage was observed also on the outside of the glass of a third cell. In the cell No. 9, a toad which weighed at its entrance 988 grains, had increased to 1116 grains. The glass cover of this cell was entire, but the luting that secured it was not attentively examined; and Dr. Buckland observes, that it is probable that there was some aperture by which small insects found admission. No. 11 had decreased from 936 to 652 grains.

The result of Dr. Buckland's experiments was, that all the toads, both large and small, inclosed in sandstone, and the small toads in the limestone, were dead at the end of thirteen months, a fate which befel all the large ones also, before the expiration of the second year: these last were examined several times during the second year, through the glass covers of their cells, but without removing them to admit air; they appeared always awake, with open eyes, and never in a state of torpor; but at each successive examination they became more and more meagre, till at last they were found dead. The two toads which when first examined had increased in weight, and were at the end of the first year carefully closed up again, were not exempt from the common annihilation, but were emaciated and dead before the expiration of the second year.

When Dr. Buckland enclosed these toads in stone, he at the same time placed four other toads, of moderate size, in three holes cut for that purpose, on the north side of the trunk of an apple-tree. Two were placed in the largest cell, and each of the others in a single cell, the cells being nearly circular, about five inches deep and three inches in diameter. These were carefully closed with plugs of wood, so as to exclude access of insects, and were apparently air tight. Every one of the toads thus 'pegged' in the

* Mémoire sur différentes parties des Sciences et des Arts. Tom. iv.
† De l'Influence des Agens physiques sur la Vie.

'knotty entrails' of the tree was found dead and decayed at the end of the first year.

Four toads were, at the time the others were shut up, each placed in a small basin of plaster of paris, four inches deep and five inches in diameter, having a cover of the same material luted over them: these were buried at the same time and in the same place with the blocks of stone, and on being examined at the same time with them, in December, 1826, two of the toads were dead; the other two alive, but greatly emaciated.

Dr. Buckland concludes from the experiments generally, that toads cannot live a year excluded totally from atmosperic air; and from the experiments made in the larger cells in the oolite, that there is a probability that those animals cannot survive two years entirely excluded from food. ('Zoological Journal,' vol. v. p. 314.)

These experiments bring us to faculties more especially possessed by the Reptiles in general, and especially by the Anurous Batrachians.

Absorption of Air and Water, Exhalation, and Transpiration.—A rapid process of absorption and evaporation of fluids, by the pores of the skin, gives to the Anurous Batrachians the power of resisting heat. If a frog be plunged into water, of a temperature of 40° (centigrade), it will not, it is asserted, live more than two minutes, though the head be left out so as to enable it to respire freely; yet a frog will sustain the action of humid air heated to the same temperature, for four or five consecutive hours. A sudden transition however, from a low temperature to a high one, is generally speedily fatal to these animals. Their proper balance of animal heat is kept up by a regulation of the evaporation of liquid absorbed, or by the transpiration of the matter, the quantity of which is augmented in proportion as the external heat is more intense; and the animal resists it as long as the moisture is not desiccated by the air. When it can no longer repair the loss of the moisture already taken up, by a fresh absorption of liquid, it perishes. The frogs, in this particular of their organization, have been compared to the vessels called Alcarazas, used for cooling water, by the transudation permitted by their porous structure. Dr Townson, who made observations to some extent upon this subject, and had two frogs, which he named Damon and Musidora, found that a frog would sometimes absorb in half an hour as much as half its own weight in water, and, in a few hours, nearly its entire weight: when the animal so filled was placed in a warm and dry situation, it gave off this fluid nearly as rapidly as it had accumulated it. He contends that the frog tribe never drink, and general observation goes to prove that the frogs, tree frogs, and salamanders do not *swallow* liquids, being supplied by the process before mentioned. The meagreness of some of these animals, in a state of comparative desiccation, and their apparent plumpness after they have renewed their supply of moisture, is very striking. If, when so supplied, they are suddenly surprised, they can get rid of their load instantaneously. Few who have come on a frog by surprise, in a moist meadow, have not observed that, during its first leap, it emits a quantity of liquid from its vent. "Whatever this fluid may be," says Dr. Townson, "it is as pure as distilled water and equally tasteless; this I assert, as well of that of the toad, which I have often tasted, as that of frogs." This fluid is the liquid absorbed, by the skin of the abdomen principally, and for which toads and frogs are ever on the look-out. The dew on the herbage is a frequent source of this necessary supply, and in dry seasons toads will bury themselves in moist sand or earth for the purpose of sucking up through their skin any aqueous particles which may be around them. The fluid is contained in a sac, generally consisting of two lobes, situated in the lower part of the abdomen under the viscera, and is conducted to the receptacle by particular vessels, which are certainly not the ureters or urinary canals from the kidneys: these urinary canals have their exit lower down in the cloaca. Blumenbach, and even Cuvier, in his "Leçons d'Anatomie Comparée," considered this bilobated bag as the urinary bladder in the frog and toad; but Townson shows that it has no connexion with the ureter, which, as we have seen, has its posterior opening lower down in the cloaca, while these receptacles terminate in the front of that intestine.

Brain, Nervous System, and Senses.—The brain and nervous system of the Anurous Batrachians are, as in the reptiles generally, composed of an encephalon consisting of a *cerebrum*, *cerebellum*, and *medulla oblongata*; a spinal chord; and the nerves which are given off from these sources to the different organs of the body. So far the system is modelled upon that of mammiferous animals and birds, but the cerebellum is proportionally much less. The reptiles have also a ganglionary nervous system, or a great double sympathetic nerve.

Touch.—The naked skin and its sensibility to variations of temperature would seem to indicate a considerable degree of perception, as to the physical and even chemical nature of the bodies with which it comes in contact. But *touch*, properly so called, can hardly exist in a high state of development in the greater part of the Anurous Batrachians. They have, indeed, no nails on their toes, which are much longer in the frogs than in the toads: and in many of the genera and species the toes are terminated by fleshy appendages, as in *Pipa*, which has also an elongated fleshy muzzle; the tree frogs also (*Hyla*), have the extremities of their toes dilated into fleshy disks, which, like the acetabula of the *Sepiadæ*, adhere by their circumference. These enable the animals to walk in all directions upon flat surfaces, and to adhere to them even when they are of the smoothest nature. The sense of touch is probably more highly developed where this organization is manifested.

Taste.—Probably not at all acute. The tongue, as we have seen, is an organ for the capture of the prey, which is swallowed entire almost in the same moment that it is taken.

Smell.—This sense would seem to be almost rudimentary in the Batrachians. A simple opening pierced from the end of the muzzle to the front of the palate, with a fleshy and concave membrane at its external extremity, moving in unison with the respiratory action, is strongly contrasted with the intricate and beautiful structure of the nasal organs, which are so highly developed in the carnivorous mammalia and birds.

Hearing.—There is a considerable difference in the structure of the organ of hearing among the Anurous Batrachians. The *Pipas*, for instance, have a sort of small valve upon the tympanum, somewhat similar to that possessed by the crocodiles, and probably intended to protect the membrane against the pressure of the water when the animal resorts to great depths. *Hyla* and *Rana* have the tympanum distinctly manifested by the delicacy of its structure when compared with the other integuments of the head. In the toads the tympanum is not apparent. The reader will find a good example of the organ of hearing in a preparation (No. 1575), in the Museum of the College of Surgeons. It is the head of a bull-frog (*Rana pipiens*, Linn.), showing the free and wide external communication, or "meatus" of the organ, and the thin, semi-transparent vibratile membrane, or drum of the ear, which is stretched across the entrance of the meatus, and is adapted to respond to the impulse of sound conveyed through air. The cavity of the tympanum is laid open on the left side from below, showing the long, slender bone (*columella*, or *ossiculum auditus*) which forms the medium of communication between the membrana tympani and the labyrinth or internal ear. The wide vertical passage, or Eustachian tube, by which the cavity of the tympanum communicates with the fauces, is also laid open on the left side, but is seen entire on the right. This communication preserves the equilibrium between the air in the cavity of the tympanum and the atmosphere without; and an equable pressure is consequently sustained by the membrana tympani under every barometrical variation. 'It may be observed,' continues the learned author of the Catalogue, 'that the extent and freedom of the Eustachian passage are in relation to the size and exposed condition of the tympanic membrane, and perhaps also to its form, which is convex externally, and therefore the more liable to be affected by undue pressure from without, being only supported behind at a small part of its superficies.'—(*Cat. Gallery Physiol. Series*, vol. iii., part 1.)

Sight.—The precision with which a toad measures the distance of an insect, and captures it with its tongue the moment the victim is within reach of that organ, shows a high and accurate development of the organs of sight, as applicable to short distances at least. The pupil is, in general, round, but in the Anurous Batrachians, whose habits are nocturnal (the toad, for instance) it is angular or linear. The humours vary in their proportions in the different genera, but the crystalline humour has been noticed of greater density and of a more spherical figure in the aquatic species. The orbits are generally incomplete, and sometimes protected, as in *Ceratophrys*, by folds of thickened cuticle.

In the Anurous Batrachians there are lachrymal glands, and the *tunica conjunctiva* is so pierced as to permit the tears to run into the cavity of the mouth.

Reproduction.—The male organs of generation in the Anurous Batrachians consist of true testicles situated in the cavity of the abdomen below the kidneys, and the deferent canals terminate in the cloaca, there being no external male organ. The ovaries in the females correspond in situation with that of the testicles of the males, and are of considerable volume. Their free extremity forms a sort of trumpet-shaped opening, and the oviduct terminates in the cloaca, whence the eggs are excluded. Blumenbach describes the frogs of his country as having a large uterus divided by an internal partition into two cavities, from which two long convoluted oviducts arise, and terminate by open orifices at the sides of the heart. The ovaria, he says, lie under the liver, so that it is difficult to conceive how the eggs get into the above-mentioned openings. The uterus, he adds, opens into the cloaca. The toads, according to him, have not the large uterus; but their oviducts terminate by a common tube in the cloaca.

At the season of reproduction, besides the vocal manifestations, there are others which visibly distinguish the male in many of the Anurous Batrachians. At each croak, the male green frogs project from the commissure of the mouth two globular bladders into which the air is introduced and the throat swells and becomes coloured. In the males of the red frog the thumbs of the anterior feet become considerably swollen and covered by a black and rugose skin at this period. The usual mode of union of the male and female, which generally takes place in the water, is too well known to require description; the former excites the latter to exclude the eggs, and fecundates them as they are protruded. These eggs are enveloped in a sort of delicate, mucous, permeable membrane; they are, when excluded, most frequently agglomerated either in glutinous masses or chaplets, and increase considerably after they are plunged in the water. There are however some curious modifications of the disposition of the eggs in certain species of the Anurous Batrachians. The accoucheur toad (*Bufo Obstetricans* of Laurenti), for instance, assists the female in excluding the chaplets of eggs, and disposes them round his thighs, something in the form of a figure of 8. He is then said to carry them about till the eyes of the embryo become visible. At the proper period for hatching, he conveys his progeny to some stagnant piece of water, and deposits them, when the eggs break and the tadpole comes forth and swims about. The male *Pipa*, or Surinam toad, as soon as the eggs are laid, places them on the back of the female, and fecundates them. The female (see the cuts at the end of this article) then takes to the water, and the skin of her back swells, and forms cellules, in which the eggs are hatched, and where the young pass their tadpole state, for they do not quit their domicile till after the loss of their tail and the development of their legs; at this period the mother leaves the water, and returns to dry land.

Swammerdam gives the number of eggs in a female frog as 1400, and M. de Montbeillard counted 1300. In these eggs there is a greenish albumen which is not easily coagulable. The yolk or vitellus is absorbed by the embryo, and an abdominal cicatrice indicates the umbilicus in young individuals. It is not rare to meet with double germs in a single egg, but most of these prove abortive, though some give birth to monsters with two heads, six legs, and two tails, as well as to hermaphrodites. The act of copulation is of considerable duration, both in the Chelonians and Anurous Batrachians; and is recorded as being prolonged from a period of eighteen days to thirty-one and upwards before the male quits the female. There seems to be a preponderance of males over females; and to this most probably may be ascribed the frequent occurrence of frogs and toads sticking on the heads of fishes, such as carp and tench. In our climates, the early part of the spring is the season of reproduction, when the frogs and toads of both sexes quit the localities of their late hybernation and their ordinary haunts, and move, instinctively to those stagnant waters which are proper for their purpose, and where they are then collected in swarms.

The young Anurous Batrachian enters life under an entirely different form from that which it is afterwards to assume; and undergoes, like the insects, a series of metamorphoses or transformations till it arrives at its perfect state. In their first stage, the young have an elongated body, a laterally compressed tail and external branchiæ; their small mouth is furnished with horny hooks or teeth for the separation of vegetables, and they have a small tube on the lower lip by which they attach themselves to aquatic plants, &c. The external branchiæ next disappear, and become covered with a membrane, being placed in a sort of sac under the throat; and the animal then, as we have observed when treating of its respiration, breathes after the manner of fishes. The head, which is furnished with eyes and nostrils, is confounded with the large globular trunk distended with the great extent of the digestive canal, and it has a large tail for swimming. In this state it is called in English a *tadpole*, and in French *têtard*, from the great apparent volume of the head. Soon the posterior limbs are gradually put forth near the origin of the tail, and are developed first; the anterior feet then begin to show themselves; the tail gradually becomes less and less, shortens, shrinks, and seems at last to be absorbed; the mouth widens, and looses its horny processes or jaws; the eyes are guarded by eye-lids; the belly lengthens and diminishes in comparative size; the intestines become short; the true lungs are developed, and the internal branchiæ are obliterated; the circulation undergoes an entire change; and the animal, hitherto entirely aquatic and herbivorous, becomes carnivorous, and for the most part terrestrial.

Mr. Thomas Wharton Jones (*Zool. Proc.*, March, 1837) observes, that when the right gill of the tadpole disappears, it is not, as is usually supposed, by the closure of the fissure through which it protrudes, but by the extension of the opercular fold on the right side towards that of the left, forming but a single fissure, common to the two branchial cavities, through which the left gill still protrudes. He also remarks, that conditions analogous to those which occur during several stages of this process exist in the branchial fissures of the anguilliform genera, *Sphagebranchus*, *Monopterus*, and *Synbranchus*.

In the museum of the Royal College of Surgeons there are numerous instructive preparations illustrative of the reproductive function in the Anurous Batrachians; they are at present unnumbered, but their numbers will be soon attached, and their descriptions published in the fourth volume of the 'Physiological Series' (Gallery). In this interesting collection will be found the male organs in *Rana*, *Bufo*, and *Pipa* (*Asterodactylus* of Wagler), and the female organs in the same genera, both in the unexcited and procreative state. There is a very complete series of the metamorphic stages of *Rana paradoxa*, with dissections demonstrative of the internal branchiæ, the convoluted intestine, and the rudimental extremities. We would particularly draw the student's attention to a female *Pipa* with the cells fully developed, containing the tadpoles in different stages, and a section showing that the cells are only skin deep, and that the cutis is separated from the subjacent muscles by large lymphatic reservoirs. Another female specimen shows the cells in progress to disappearance after their function has been performed.

Particular Excretions.—The alleged venom of the common toad, so long a subject of popular belief, had been rejected by many modern naturalists, among whom Cuvier may be particularly mentioned. Dr. Davy however found the venomous matter to be contained in follicles, chiefly in the true skin and about the head and shoulders, but also distributed generally over the body and on the extremities. Pressure causes this fluid to exude or even spirt out to a considerable distance, and a sufficient quantity may be thus collected for examination. Dr. Davy found it extremely acrid when applied to the tongue, resembling the extract of aconite in this respect; and it even acts upon the hands. With a small residuum it is soluble in water and in alcohol: acetate of lead and corrosive sublimate do not affect the solutions. It remains acrid on solution in ammonia; and when dissolved in nitric acid, it imparts a purple colour to it. Combined with potash or soda, it becomes less acrid, apparently in consequence of partial decomposition. It is highly inflammable as left by evaporation of its aqueous or alcoholic solutions; and the residuum which appears to give it consistence seems to be albumen. More acrid than the poison of the most venomous serpents, it produces no ill effect when introduced into the circulation. A chicken inoculated with it was not affected. Dr. Davy conjectures that this 'sweltered venom' is a defence to the toad from carnivorous animals; and we have seen a dog, when urged to attack one, after some hesitation, drop the animal from

its mouth in a manner that left no doubt that he had felt the effects of this excretion, which Dr. Davy thinks may be auxiliary in decarbonizing the blood.

The toads are also said to possess, besides, two glandular masses (parotids), which, when pressed, exude through small holes a yellowish thick humour of a musky odour. The other odours also which many species of toads produce, it does not seem yet ascertained from what source, are very remarkable. Roesel, author of the beautiful work on Frogs, compares some of these to the smell of garlick or of volatilized sulphur of arsenic, or even ignited gunpowder; others again, he says, produce an effect on the nose like the vapour of horseradish, mustard, or the leaves of monk's-hood rubbed between the fingers. In one instance only he states it to be probable that this emanation comes from the cloaca; and such seems to be the opinion of M. Duméril, who states that he has been assured that, in certain instances, the water in which some of these animals had been placed and there purposely irritated or excited, had become so acrid that the tadpoles of frogs and salamanders introduced therein hardly survived the immersion.

Geographical Distribution and Habits.—Warm and temperate but moist climates are the localities most favourable to the Anurous Batrachians. Extreme cold is fatal to them, and so is extreme dry heat. They are unable to sustain violent and sudden changes of temperature. In moderately warm climates, and those where there is a considerable degree of cold during a part of the year, they bury themselves, in winter, either under the earth or in the mud at the bottom of the water, and there pass the season of hybernation without taking food or air, till the spring calls them forth; when the same frog which had passed so many months without respiration would expire in a few minutes if prevented from shutting its mouth and so supplying itself with air by deglutition. The general habits of the tribe may be collected from the different sections of this article, and from the descriptions of those forms in it which may be noticed in the course of this work.

NATURAL HISTORY AND SYSTEMATIC ARRANGEMENT.

Aristotle appears to have been well acquainted with such of the Anurous Batrachians as fell within the scope of his observation. He separates the marsh-frogs from the toads and tree-frogs, and gives a good account of their organization, habits, and reproduction, excepting that he seems to have been of opinion (*Hist.* lib. v. c. 3) that there was intromission on the part of the male. (*Hist.* lib. i. c. 1; lib. ii. c. 1, 15; lib. iii. c. 1, 12; lib. iv. c. 5, 9, 11; lib. vi. c. 14; lib. viii. c. 2, 28, &c.) Pliny, whose Natural History is little better than a collection of ill-digested notes,* and who borrowed most largely from Aristotle, treats of the Reptiles in book xi., and describes with sufficient accuracy the tongue and voice of frogs (c. 65, 112).

Bélon, Rondelet, Salviani, and Gesner, are the first authors who claim our attention after the long dark period which began to brighten about the commencement of the sixteenth century. The latter, who devoted thirty-four folio pages to the natural history of frogs, accumulated a vast mass of facts, and deserves the praise lavished upon him by such men as Boerhaave and Tournefort. Aldrovandi followed towards the close of the same period, and, at his death, in 1605, left materials for fourteen volumes, in folio, which were afterwards published. A considerable portion of his first book on digitated oviparous quadrupeds is occupied by his history and commentaries on the frog tribe. Jonston notices them, but comprises his compiled history within the compass of two not very long articles.

Our countryman Ray appears at the head of the systematic writers on the subject, and though his 'Synopsis' cannot be considered as much more than a sketch, it deserves attention as an attempt at natural classification.

Linnæus, at first, made his 'Amphibia' consist of animals whose body was either naked or scaly, whose teeth were pointed and which had no grinders, and no radiated fins. He afterwards added the *Diodon*, and the greater part of the cartilaginous fishes, under the designation of 'Amphibia Nantes.'

The first classification was the result of his own views, and he appears to have been misled into the second by the assertions of Dr. Garden. In the last edition of the 'Systema Naturæ' (the 12th) he places the great genus *Rana* between the genera *Testudo* and *Draco*, making it the second genus of his first order, *Reptilia*, of his third class, *Amphibia*. The *Reptilia* he shortly characterizes as 'pedati, spirantes ore,' and admits into it the genus *Lacerta* in addition to the genera above stated. The 'Amphibia Serpentes' and 'Amphibia Nantes' form the other two orders.

Passing by Klein (1751) we come to the work published with the name of Dr. Laurenti,† which has done so much for this branch of zoology. The class 'Reptilia' comprehends, in this book (1768), three orders only, viz. the *Salientia*, *Gradientia*, and *Serpentia*. The *Salientia* comprise the Anurous Batrachians, consisting of the following genera: the Pipas (*Pipa*), the Toads (*Bufo*), the Frogs (*Rana*), and the Tree-Frogs (*Hyla*). The author adds the genus *Proteus*, founded on the larva of *Rana paradoxa*.

Before the appearance however of the 'Specimen Medicum' of Laurenti, Roesel published his magnificent work on the Frogs of his country (Nuremberg, 1758). He is justly noticed by Cuvier as one of the most ingenious observers and elegant designers of subjects of natural history.

Scopoli (1777) varies so little in arrangement from Linnæus, though the characters are differently but not better worded, that he need not detain us from the work of Lacépède, published (1788, 1790) as a continuation of Buffon, under the title of 'Histoire Naturelle des Quadrupèdes Ovipares et des Serpens.' Under the second class of his oviparous quadrupeds he ranges the Frog tribe in three genera, *Les Grenouilles*, *Les Raines*, et *Les Crapauds*, and these genera comprise 33 species.

M. Alex. Brongniart (1799, 1800, 1803) divides his class *Reptiles* into four orders, viz. *Chelonians*, *Saurians*, *Ophidians*, and *Batrachians*: in this fourth order he admits the genera *Grenouille*, *Crapaud*, *Raine*, and *Salamandre*.

Latreille (1801, 1825) makes the *Amphibia* a class, which he divides into two orders, the *Caducibranchiata* and *Perennibranchiata*. The Caducibranchiate Amphibia he subdivides into the *Anurous* or tailless, and the tailed (*Urodèles*). The first subdivision comprises the genera *Pipa*, *Bufo*, *Rana*, and *Hyla*.

Daudin, in his 'Traité Général' (1802, 1803), adopts the method of Brongniart, and seems to have bestowed much research on the Anurous Batrachians, of which he has left an 'Histoire Particulière,' in one vol. 4to. with 38 plates representing 54 species.

Cuvier (1798, 1817, 1829) admits the following genera among the Anurous Batrachians in his last edition of the 'Règne Animal:'—*Rana*, *Ceratophrys*, *Dactylethra*, *Hyla* (*Calamita* of Schneider and Merrem), *Bufo*, *Bombinator* (*Rhinella* of Fitzinger, *Oxyrhynchus* of Spix), the *Otilophes*‡ (Cuv.), *Breviceps* of Merrem (*Engystoma* of Fitzinger in part), and *Pipa*.

M. Duméril, who states that he has made Reptiles his particular study, and who succeeded to the chair of M. Lacépède, has published much on the subject, and promises at the end of the last volume on the 'Reptiles' (*Suites à Buffon*) to present a complete table of arrangement. This work has not yet advanced to the Batrachians.

Oppel, besides his two memoirs in the 19th vol. of the 'Annales du Muséum de Paris,' one of which was upon the Batrachians, published in 1811 his 'Prodromus,' in 4to. His third order of 'Naked Reptiles or Batrachians' is divided into the Apoda (*Cecilia*), the *Ecaudata* or Anurous Batrachians (Frogs), and the *Caudata*, *Urodèles* or Tailed Batrachians. *Bufo*, *Pipa*, *Rana*, and *Hyla*, are the genera of the Anurous Batrachians.

Merrem (1790, 1820, 1821) makes his second class, the Batrachians, consist of three orders, viz.: 1, *Apoda* (*Cecilia*); 2, *Salientia*; and 3, *Gradientia*. Among the *Salientia*, which are the Anurous Batrachians, are comprised the genera *Hyla* or *Calamita*, *Rana*, *Breviceps*, *Bombinator*, *Pipa*, and *Bufo*.

M. de Blainville (1816, 1828) divides the Reptiles into two classes, the second of which, *Ichthyoïd Amphibians* or *Nudipelliferous* (naked-skinned) *Reptiles*, has for the first of its four orders the *Batrachians*, which consist of the four leading generic forms of Anurous Batrachians, and are

* 'Un auteur sans critique, qui, après avoir passé beaucoup de temps à faire des extraits, les a rangés dans certains chapitres, en y joignant des réflexions qui ne se rapportent pas à la science proprement dite; mais qui offrent alternativement les croyances les plus superstitieuses unies aux déclamations d'une philosophie chagrine.' (Cuvier.)

† There are those who attribute this leading work to Winterl, a chemist, and the companion of Laurenti's studies.

‡ Type, Rana Margaritifera.

separated into two suborders according to their habits, the first being the Aquiparous, and the second the Dorsigerous (*Pipa*).

Mr. Gray (1825, 1831) considers the *Amphibia* a separate class, and, like Fitzinger (1826), divides them into those which undergo a metamorphosis and those which do not. He subdivides the *Ranidæ* into the genera *Rana, Ceratophrys, Hyla, Bufo, Rhinella, Dactylethra, Bombinator, Strombus, Breviceps*, and *Asterodactylus* (Wagler), or the *Pipas*. In 1835 he introduced to the Zoological Society a toad (*Bombinator Australis*) from Swan River, observing that the form had not been previously met with out of Europe.

The zoological divisions of MM. Carus and Ficinus appeared about the same time, and they adopt, with regard to the Reptiles, very nearly the classification of Merrem and the views of Oken, whose works were published in 1809, 1816, and 1821.

Dr. Harlan, in 1825, published his account of the American Reptiles, which he divides into Batrachians, Ophidians, Saurians, and Chelonians. Several species of the Caudated Batrachians are enumerated, and they are followed by the Tailless Batrachians, as *Rana, Bufo, Hyla*.

Mr. Haworth, in his dichotomous or binary method (1825), divides the *Batrachia* into *Apoda* and *Pedata*: the latter he subdivides into *Salientia*, as *Pipa, Hyla, Bufo, Bombinator, Breviceps, Rana;* and *Gradientia*, which he subdivides into the *Mutabilia* (those which undergo a metamorphosis, *Salamandræ* for instance) and the *Immutabilia* (those which do not, *Proteus* and the *Sirens*).

Fitzinger (1826) separates the Reptiles into the *Monopnoa* and *Dipnoa*, and the latter he subdivides into—1, the *Mutabilia;* 2, the *Immutabilia*. In the first subdivision are found the *Ranoïds*, the *Bufonoïds*, the *Bombinatoroïds*, the *Pipoïds*, and the *Salamandroïds*. The four first embrace the whole of the Anurous Batrachians. The *Pipoïds* are characterized as having no tongue, an organ which exists in the three other families. In the *Bombinatoroïds* the tympanum is hidden, whilst it is perceptible in the *Bufonoïds*, which have no teeth, and are thus distinguished from the *Ranoïds*, where the teeth are distinct.

Ritgen (1828) divides the Anurous Batrachians or *Pygomolgi* into the Tree-Frogs, *Bdallipodobatrachians;* the Frogs, *Phyllopodobatrachians;* and the Toads, *Diadactylobatrachians*.

The system of Wagler (1830) takes organization as the basis of its arrangement, and he makes the class *Amphibia* consist of eight orders, viz.: the *Tortoises*, the *Crocodilians*, the *Lizards*, the *Serpents*, the *Orvets*, the *Cecilias*, the *Frogs*, and the *Ichthyodes*.

He then characterizes the seventh order, that of the Frogs (*Ranæ*), as having no penis, and undergoing a metamorphosis; and divides them into two families, the first consisting of those without a tongue (*Aglossæ*), and the second of those which possess a tongue (*Phaneroglossæ*). The first of these consists of but one genus, *Asterodactylus* (*Pipa*); the rest of the genera of the Anurous Batrachians belong to the second. Such are *Xenopus* (Wagler), *Microps* (Wagler), *Calamita* (Fitzinger), *Hypsiboas* (Wagler), *Auletris* (Wagler), *Hyas* (Wagler), *Phyllomedusa* (Wagler), *Scinax* (Wagler), *Dendrobates* (Wagler), *Phyllodytes* (Wagler), *Enydrobius* (Wagler), *Cystignathus* (Wagler), *Rana* (Linnæus), *Pseudis* (Wagler), *Ceratophrys* (Boïé), *Megalophrys* (Kuhl), *Hemiphractus* (Wagler), *Systoma* (Wagler), *Chaunus* (Wagler), *Paludicola* (Wagler), *Pelobates* (Wagler), *Alytes* (Wagler), *Bombinator* (Merrem), *Bufo* (Linnæus), *Brachycephalus* (Fitzinger).

Müller (1832) divides the Amphibia into two great orders, the *Scaly* and the *Naked*. The Anurous Batrachians belong of course to the latter. He thus places the characters of the two orders in opposition to each other.

Scaly.	*Naked.*
Occipital condyle simple	Double.
True ribs	None or mere rudiments.
Auricle of the heart double	Simple.*
Internal ear with fenestræ ovalis and rotunda	Fenestra ovalis only.
Cochlea (*limaçon* of the French), distinct	None.
Penis, simple or double	None.
No metamorphosis	Generally a distinct metamorphosis.
No branchiæ	Distinct branchiæ, with either persistent or non-permanent holes.
Skin scaly, escutcheoned, or cuirassed	Naked.

* Dr. Davy and MM. Saint Ange and Webert have, as we before stated, ascertained that the auricle, which is apparently simple, is in reality separated into two divisions by a complete partition.

Schinz (Naturgeschicte und Abbildungen der Reptilien, Leipzig, 1833) follows for the most part the classification of Wagler. There are numerous plates, collected from the best authorities, and it may be considered a good class-book.

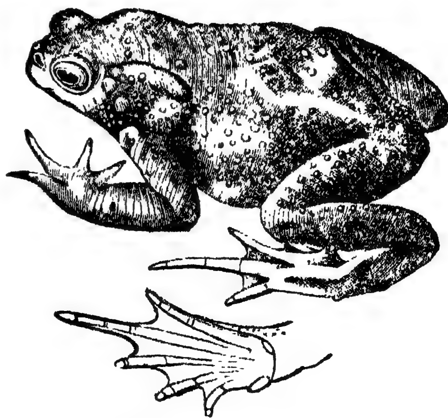
The following cuts will convey to the reader an idea of some of the leading forms among the Anurous Batrachians in their adult state.



Rana palustris (two thirds nat. size).
Europe.



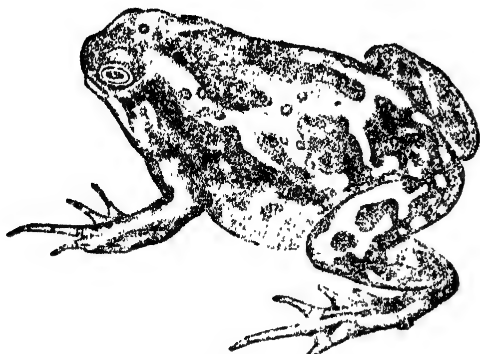
Ceratophrys granosa (two-thirds nat. size).
America.



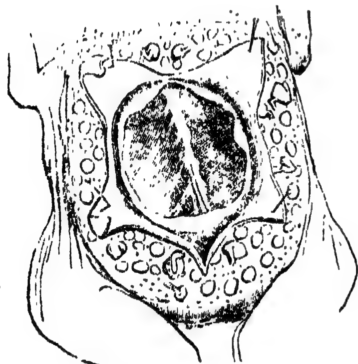
Bufo vulgaris (half nat. size).
Europe.
With an under view of the foot



Oxyrhynchus bicolor
South America.

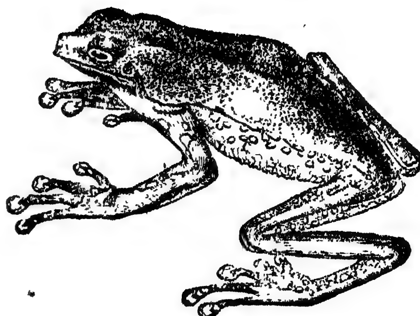


Engystoma marmoratum
India.





Pipa monstrosa, Laurenti (Asterodactylus of Wagler), Surinam Toad, female, reduced. The upper figure shows the disposition of the cells, and their situation in the skin, which is turned back, and the muscle seen below. The small separate figures are tadpoles, in different stages of development.



Hyla bicolor (half nat. size).
South America.

Fossil Frogs.

Fossil frogs have been found in the coal-formation of the Rhine (*Papier-kohl*) in company with the fishes *Leuciscus macrurus* and *L. papyraceus*. Two species have been described, and there are many examples in the museum at Bonn. In this country specimens are to be found in the collections of Lord Cole and Sir Philip Egerton, bart.

FROGSBIT, the common name of a wild water-plant, called Hydrocharis Morsus Ranæ.

FROISSART (JEAN, or JOHN), was born at Valenciennes about 1337. He was the son, as is conjectured from a passage in his poems, of Thomas Froissart, a herald-painter, no inconsiderable profession in the days of chivalry. The youth of Froissart, from twelve years upwards, as he himself informs us, was spent in every species of elegant indulgence. In the midst of his dissipation however, he early discovered the ardent and inquisitive spirit to which we owe so much; and even at the age of twenty, at the command of his 'dear lord and master, Sir Robert of Namur, lord of Beaufort,' he began to write the history of the French wars. The period from 1326 to 1356 was chiefly filled up from the chronicles of Jean le Bel, canon of Liége, a confident of John of Hainault, and celebrated by Froissart for his diligence and accuracy. It is reasonable to believe that this work was interrupted during a journey to England in the train of Philippa of Hainault, the heroic wife of Edward III., and mother of the Black Prince. Froissart was for three or four years secretary, or clerk of her chamber, a situation which he would probably have retained but for a deep-rooted passion for a lady of Flanders, which induced him to return to that country; a circumstance equally favourable to the history of the Continent, and unfortunate for that of Britain. During his residence in England he visited the Scottish mountains, which he traversed on a palfrey, carrying his own portmanteau, and attended only by a greyhound. His character of historian and poet introduced him to the court of David II., and to the hardly less honourable distinction of fifteen days' abode at the castle of Dalkeith with William, earl of Douglas, where he learned personally to know the race of heroes whose deeds he has repeatedly celebrated. He was in France at Melun-sur-Seine about April 20th, 1366; perhaps private reasons might have induced him to take that road to Bordeaux, where he was on All Saints' day of that year, when the princess of Wales was brought to bed of a son, who was afterwards Richard II. The prince of Wales setting out a few days afterwards for the war in Spain against Henry the Bastard, Froissart accompanied him to Dax, where the prince resided some time. He had expected to attend him during the continuance of this great expedition, but the prince would not permit him to go farther; and shortly after his arrival sent him back to the queen his mother. Froissart could not have made any long stay in England, since in the following year, 1368, he was at different Italian courts. It was this same year that Lionel, duke of Clarence, son of the king of England, espoused Joland, daughter of Galeas II., duke of Milan. Froissart, who probably was in his suite, was present at the magnificent reception which Amadeus, count of Savoy, surnamed the Count Verd, gave him on his return: he describes the feasts on this occasion, and does not forget to tell us that they danced a virelay of his composition. From the court of Savoy he returned to Milan, where the same count Amadeus gave him a good *cotardie*, a sort of coat, with twenty florins of gold; from thence he went to Bologna

and Ferrara, where he received forty ducats from the king of Cyprus, and thence to Rome. Instead of the modest equipage he travelled with into Scotland, he was now like a man of importance, travelling on a handsome horse, attended by a hackney. It was about this time that Froissart experienced a loss which nothing could recompense—the death of queen Philippa, which took place in 1369. He composed a lay on this melancholy event, of which, however, he was not a witness; for he says, in another place, that in 1395 it was twenty-seven years since he had seen England. According to Vossius and Bullart, he wrote the life of queen Philippa; but this assertion is not founded on any proofs.

Independently of the employment of clerk of the chamber to the queen of England, which Froissart had held, he had been also of the household of Edward III., and even of that of John king of France. Having however lost his patroness, he did not return to England, but went into his own country, where he obtained the living of Lestines. Of all that he performed during the time he exercised this ministry, he tells us nothing more than that the tavern-keepers of Lestines had five hundred francs of his money in the short space of time he was their rector. It is mentioned in a manuscript journal of the bishop of Chartres, chancellor to the duke of Anjou, that, according to letters sealed December 12, 1381, this prince caused to be seized fifty-six quires of the 'Chronicle' of Froissart, rector of the parish of Lestines, which the historian had sent to be illuminated, and then to be forwarded to the king of England, the enemy of France. Froissart attached himself afterwards to Wenceslaus of Luxembourg, duke of Brabant, perhaps in quality of secretary. This prince, who had a taste for poetry, commissioned Froissart to make a collection of his songs, rondeaus, and virelays; and Froissart, adding some of his own pieces to those of the prince, formed a sort of romance, under the title of 'Meliador; or, the Knight of the Sun;' but the duke did not live to see the completion of the work, for he died in 1384.

Immediately after this event, Froissart found another patron in Guy count de Blois, who made him clerk of his chapel, for which Froissart testified his gratitude by a pastoral and epithalamium on a marriage in the family. He passed the years 1385, 1386, and 1387 sometimes in the Blaisois, sometimes in Touraine; but the count de Blois having engaged him to continue his history, which he left unfinished, he determined in 1388 to take advantage of the peace which was just concluded to visit the court of Gaston Phœbus count de Foix, in order to gain full information of whatever related to foreign countries and the more distant provinces of the kingdom. His journey to Ortez, the chief residence of the count de Foix, in company with Sir Espaing du Lyon, is one of the most interesting parts of Froissart's 'Chronicle.' The count de Foix (of whom we have already spoken in a former article) received and admitted him as a member of his household. Here Froissart used to entertain Gaston after supper by reading to him the romance of 'Meliador,' which he had brought with him. After a long sojourn at the court of Ortez he returned to Flanders by the route of Avignon. We learn from a poem referred to by Monsieur de St. Palaye, that on this occasion the historian, always in quest of adventures, met a personal one with which he could have dispensed, being robbed of all the ready money which his travels had left him. After a series of journeys into different countries for the sake of obtaining information, we find him in 1390 in his own country, solely occupied in the completion of his history, at least until 1393, [illegible] he was again at Paris. From the year 1378 he had obtained from pope Clement VII. the reversion of a canonry at Lille, and in the collection of his poetry, which was completed in 1393, and elsewhere, he calls himself canon of Lille; but pope Clement dying in 1394, he gave up his expectations of the reversion, and began to qualify himself as canon and treasurer of the collegiate church of Chimay, which he probably owed to the friendship of the count de Blois.

In 1395 Froissart revisited England, where he was received with marks of high favour and affection by Richard II. and the royal family. Here he went on collecting for his history, and had the honour to present his 'Meliador' to the king, who was much delighted with it, 'for he could speak and read French very well.' After a residence of three months Froissart left England, and at his departure received from the king a silver goblet containing a hundred nobles. He finally settled at his benefice of Chimay, and employed as usual the hours of his leisure in arranging and detailing the information collected in his travels. Four years brought him to 1399, when the melancholy fate of his benefactor Richard II. became the subject of his latest labours. It is uncertain how long Froissart survived the death of Richard and the conclusion of his 'Chronicle;' he was then about sixty years old, and died shortly after at Chimay, according to an entry in the obituary of the chapter.

The period of history embraced in Froissart's 'Chronicle' is from 1326 to 1400. The best of the old editions of the original is that of Lyon, in four volumes, in folio, 1559. The latest is that in the 'Collection des Chroniques Nationales Françaises, avec Notes et Eclaircissements, par J. A. Buchon,' in fifteen volumes, 8vo., Paris, 1824-1826. Froissart's 'Chronicle' seems to have been first printed at Paris by Ant. Verard, without date, 4 vols. in folio, and was reprinted by Guill. Eustace, Par. 1514. There are two English translations; one by Bourchier lord Berners, made 'at the high commandment' of king Henry VIII., fol. Lond., Pinson, 1525-6; reprinted in two volumes, 4to., Lond., 1812, under the editorial care of E. V. Utterson, Esq.; the other, 'with additions from many celebrated MSS.,' translated by Thomas Johnes, Esq., appeared 'from the Hafod press,' in four volumes, 4to., 1803-1805.

The principal particulars of Froissart's life have been here condensed from that by St. Palaye, translated and edited by Mr. Johnes, 8vo., Lond., 1801, and revised and re-published in 4to., Hafod, 1810.

There are several splendidly illuminated manuscripts of Froissart's 'Chronicle,' quite or nearly contemporary, preserved in the British Museum: one a complete copy, belonging to the old royal library of the kings of England, 14 D. ii.-vi.; another consisting of the second and fourth books in the same collection, 18 E. i. and ii.; a third in the Harleian Library, MSS. 4379 and 4380, containing the fourth book only; the fourth copy is in the Arundel collection lately transferred from the library of the Royal Society, No. 97, containing the first, second, and third books; but this MS. is mutilated, and has lost many of its illuminations.

FROME, a town in the parish of Frome Selwood and hundred of Frome, and in the county of Somerset, 105 miles west-by-south from London. It is agreeably situated on the river Frome, a branch of the AVON, and on the north-east declivity of several hills contiguous to the forest of Selwood, whence the town is frequently called Frome-Selwood. It is lighted with gas, but irregularly built, and the streets are narrow and ill-paved. The borough of Frome was not represented before the passing of the Reform Act; it now returns one member. It is not incorporated. It was formerly governed by a bailiff, but is now under the superintendence of the county magistrates. Frome is in the diocese of Bath and Wells. The parish church, dedicated to St. John Baptist, is a handsome structure, surmounted by a quadrangular tower with a neat stone spire. The average net income of the vicarage is 720*l.*; patron, the marquis of Bath. The town is said to be prospering, and contains several extensive manufactures of woollen cloth, mills for rolling iron, and some considerable breweries. According to the census taken in 1831, its population was 11,240. There is a grammar-school of the foundation of Edward VI., besides several other institutions, among which is a good charity-school. The market-day is Wednesday. The cattle-fairs are held 24th February, 22nd July, 14th September, and 25th November.

(Carlisle's *Top. Dict.*; Collinson's *Hist. and Ant. of the County of Somerset*, Bath, 1791; *Beauties of England and Wales*; *Parliamentary Papers*, &c.)

FROME, river. [SOMERSETSHIRE.]

FROND, a botanical term intended to express such organs as are composed of a stem and a leaf combined; the leaves of ferns and palms were thought to be of this nature; but as it is now known that the leaves of such plants are in no important respect different from those of other plants, the term frond has ceased to have any precise meaning, and is disused by the best botanists.

FRONDE, the name of a political faction in France during the minority of Louis XIV., which was hostile to the prime minister, Cardinal Mazarin, and to the queen regent, who supported him. In consequence of some disputes between the parliament of Paris and the court, on the occasion of some new taxes levied by the minister, the car-

dinal ordered the arrest of the president and of one of the councillors of the parliament in August, 1648, and this act was the signal of a civil war. The party opposed to the court affected to declare themselves not against the queen's government, but only against the cardinal, whom they attacked by accusations and lampoons, from which they derived the name of 'Frondeurs,' 'censurers,' or 'jeerers.' They had for leaders the duke of Beaufort, the duke of Némours, the prince of Conti, the duke de Vendôme, the abbé de Retz (afterwards cardinal), marshal Turenne, and other men of the first rank, as well as ladies, among others the duchess de Longueville, who was a most conspicuous and violent partisan. The people of Paris took part with the Frondeurs: they drew chains across the streets, attacked the troops, and obliged the queen to liberate the two members of the parliament. This was called 'the day of the barricades.' A kind of truce took place, but the parliament continued refractory, the court hostile, and the people tumultuous; and the queen regent seeing herself obliged, in January, 1649, to remove from Paris with her son to St. Germain, charged the duke of Orleans and the prince of Condé with the task of reducing Paris by blockade. Louis XIV. was then little more than ten years of age, but he never forgot the humiliation of being obliged to leave his capital, and this was the first cause of his subsequent hostility towards the parliament. That court, in the mean time, exercised sovereign power in the capital, levied troops, and passed a resolution declaring cardinal Mazarin a public enemy, and outlawing him. ('Histoire du Parlement de Paris,' Amsterdam, 1769.) After some fighting in the neighbourhood of Paris a truce was made, a general amnesty was granted by the queen, the parliament retained full liberty to assemble, and the queen, king, and minister re-entered Paris in the month of August. The disturbances, however, continued in the provinces, especially in Provence and Guienne, where the local parliaments resisted the authority of the respective royal governors. In 1650 the queen, hurt by the overbearing tone and high pretensions of the prince of Condé, made her peace with some of the Frondeur leaders, and caused the princes of Condé and Conti to be arrested. Upon this the duchess of Longueville, marshal Turenne, and others, raised the standard of revolt in the provinces, and were joined by the Spaniards from Flanders. The war, which now assumed a more serious aspect, continued till 1653, when Turenne made his peace with the court, and Mazarin returned in triumph to Paris.—[CONDÉ, LOUIS DE.]

FRONDICULA'RIA. [FORAMINIFERA.*]

FRONDI'PORA. [MILLEPORIDÆ.]

FRONTIGNAN. [HERAULT.]

FRONTI'NUS, SEXTUS JULIUS, born of a patrician family, was prætor of Rome, A.D. 70, and about five years later was sent by Vespasian to Britain, where he seems to have remained three years, during which he conquered the Silures. (Tacitus, *Agricola*, 17.) About A.D. 78 he was succeeded by Agricola in the command of the troops in Britain. On his return to Rome he wrote, under the reign of Domitian, his work 'Strategematica,' in four books, in which he gives short anecdotes of numerous Greek and Roman generals, illustrative of the practice and resources of war. Nerva entrusted him with the superintendence of the supply of water to Rome, and while filling this office, which he retained under Trajan, he wrote his work on the aqueducts, which has been printed in the earlier editions under the title of 'De Aquis quæ in Urbem influunt,' but is now generally known by the title 'De Aquæductibus.' It contains much valuable information on the mode in which antient Rome was supplied with water, and on everything that concerned this important part of the economy of that city. Frontinus died under Trajan, about A.D. 106. Several other works have been attributed to him, such as 'De Coloniis,' 'De Limitibus,' 'De Qualitate Agrorum,' but seemingly without foundation. See the Bipontine edition of his works, with a life of Frontinus, 8vo., 1788. His work 'De Aquæductibus' was translated into French and illustrated by engravings, 4to., Paris, 1830.

FRONTISPIECE, the front or principal face of a building; the front-view; anything seen in or at the front. Johnson says, 'id quod in fronte conspicitur.' Hence, by a figure, we call the engraved title of a book or the print which faces the title-page a frontispiece.

* In this article '[illegible]' is erroneously printed for '[illegible],' in the first column; and '[illegible]' for '[illegible]' in two places in the second.

FRONTO, MARCUS CORNELIUS, born at Cirta, in Africa, of an Italian family, after studying in his own country, came to Rome in the reign of Hadrian, and acquired great reputation as a rhetorician and grammarian. Antoninus Pius appointed him preceptor to his two adopted sons, Marcus Aurelius and Lucius Verus, whose confidence and affection he gained, as is proved by their letters. After being consul, Fronto was appointed to a government in Asia, which his bad health prevented him from filling. His learning and his instructive conversation are mentioned with praise by Aulus Gellius, the historian Appian, and others of his contemporaries. He died in the reign of Marcus Aurelius, at an advanced age. Until of late years we had nothing of his works, except fragments of his treatise 'De Differentia Verborum,' being a vocabulary of the so-called synonymes; but in 1815 Angelo Mai having discovered in the Ambrosian library at Milan a palimpsest MS. on which had been originally written some letters of Fronto to his two pupils, deciphered the text wherever the writing was not entirely obliterated, and published it with notes. It happened, by singular good fortune, that Mai, being some years after appointed librarian of the Vatican, discovered in another palimpsest volume another part of Fronto's letters, with the answers of Marcus Aurelius and Verus. Both the volumes came originally from the convent of St. Columbanus, at Bobbio, the monks having written them over with the Acts of the 1st council of Calchedon. It happened that one of the volumes was transferred to Milan, and the other to Rome. Mai published the whole in a new edition: 'M. Cornelii Frontonis et M. Aurelii imperatoris epistulæ: L. Veri et Antonini Pii et Appiani epistularum reliquiæ: Fragmenta Frontonis et scripta grammatica,' 8vo., Rome, 1823. These letters are very valuable, as throwing additional light on the age of the Antonines, confirming what we know of the excellent character of Marcus Aurelius, and also showing his colleague Verus in a more favourable light than he had been viewed in before. The affectionate manner in which both emperors continue to address their former preceptor is very touching. Two or three short epistles of Antoninus Pius are also interesting. There are besides many letters of Fronto to various friends, a few of which are in Greek. The work was translated into French, and published with the text and notes, 2 vols. 8vo., Paris, 1830.

FROSINO'NE, DELEGAZIONE DI, a province of the Papal state, is bounded on the north and west by the Comarca or province of Rome, east by the Terra di Lavoro in the kingdom of Naples, and south by the Mediterranean. Its greatest length from north to south, from the ridge north of Anagni, which divides the valley of the Sacco from that of the Anio, which latter makes part of the province of Rome, to Monte Circello, which is the most southern point of the Papal state, is about 40 miles; its greatest breadth is about 30 miles, and its area is reckoned to be 1360 square miles. (Neigebaur, *Gemälde Italiens.*) Its population in 1830 was 123,300. (Calindri, *Saggio Statistico dello Stato Pontificio.*) This province includes also in its jurisdiction the small district of Ponte Corvo, which is in the valley of the Liris, within the territory of Naples, but belongs to the pope. The province of Frosinone consists of four natural divisions: 1. The Valley of the Sacco, which is fertile; 2. The mountains north of it, the Hernica Saxa, or Rocks of the Hernici, which are mostly barren; 3. The Mounts Lepini, Volscorum Montes, south of the valley of the Sacco, which are partly cultivated; and 4. The Pomptine Marshes, extending south of the Mounts Lepini to the sea-coast as far as Monte Circello and Terracina. The province contains 7 towns and 45 terre, or villages, having a communal council, and 24 hamlets. (Calindri.) Frosinone, built on a hill above the junction of the river Cossa with the Sacco, is the capital of the province, and the residence of the delegate. An account of the principal towns of this province is given under CAMPAGNA DI ROMA.

FROST. [FREEZING.]

FROST-BEARER, or Cryóphorus, an instrument invented by Dr. Wollaston for exhibiting the freezing of water in vacuo, and at a distance from the source of cold; his directions for making it and for its use are nearly thus given in the 'Philosophical Transactions' for 1813:—

Let a glass tube be taken, having its internal diameter about one-eighth of an inch, with a ball at each extremity of about one inch in diameter, and let the tube be bent to a right angle at the distance of half an inch from each ball. One of these balls should contain a little water, but if it is

more than half full, it will be liable to be burst by the expansion of the water in freezing; the remaining cavity should be as perfect a vacuum as can be readily obtained. One of the balls is made to terminate in a capillary tube, and when water admitted into the other has been boiled over a lamp for a considerable time, till all the air is expelled, the capillary extremity, through which the steam is still issuing with violence, is held in the flame of the lamp till the force of the vapour is so far reduced, that the heat of the flame has power to seal it hermetically.

When an instrument of this description has been successfully exhausted, if the ball that is empty be immersed in a freezing mixture of salt and snow, the water in the other ball, though at the distance of two or three feet, will be frozen in the course of a very few minutes. The vapour contained in the empty ball is condensed by the common operation of cold, and the vacuum produced by this condensation gives opportunity for a fresh quantity to arise from the water in the opposite ball, and with so great a reduction of its temperature, that the water freezes.

According to the doctrine which does not admit of the existence of positive cold, we should represent the heat of the warmer ball to be the agent in this experiment, generating steam as long as there remains any excess of heat to be conveyed. But if we should express the cause of its abstraction, we must say that the cold mixture is the agent, and may observe in this instance, that its power of freezing is transferred to a distance by what may be termed the negative power of steam.

FROZEN OCEAN, a term used to indicate the seas surrounding the Poles, in which great masses of ice swim about. It is consequently synonymous with Icy Sea, and in some degree also with what are called the Arctic and Antarctic Seas or Oceans.

FRUIT, in botanical language, signifies that part of a plant in which the seed is lodged, whatever its size, colour, or texture may be, so that the seed-like grain of a sage, the grain of corn, the nut of a chestnut, the dry capsule of a lilac bush, are as much fruits as those of a peach, an apple, or a pine-apple. In the ordinary acceptation of the term however the word fruit is exclusively applied to seed cases which are eatable, and generally to such as require no preparation to render them fit for food.

The eatable fruits known in this climate are of so much importance to the comfort as well as luxury of society, that without entering much into details we shall here introduce some general observations, which will inform our readers what are the kinds most deserving of cultivation in select or confined gardens. In doing which we have the advantage of producing in a condensed form the important results of the laborious and costly investigations conducted for so many years in the garden of the Horticultural Society of London at Turnham Green. These have already been made known to the public in the second edition of the 'Catalogue of Fruits,' cultivated in that establishment; and our only task is to make a judicious selection from the thousands of varieties included in the Society's list.

The species of cultivated fruits are far from numerous; and most of those of the temperate regions have been introduced, at one period or another, into Britain. The genera from which these have sprung are comparatively few, and chiefly included in the natural orders Rosaceæ, Vitaceæ, Urticaceæ, and Grossulaceæ. To the first of these are to be referred the genera producing the species called apples, pears, plums, cherries, apricots, peaches, and nectarines, quinces, medlars, raspberries, and strawberries; to the second, the vine; to the third, the fig and mulberry; and to the fourth, the gooseberries and currants. Moreover there are chestnuts and filberts belonging to Corylaceæ; walnuts to Juglandaceæ, and the melon and pine-apple respectively to Cucurbitaceæ and Bromeliaceæ.

In this place we shall briefly enumerate what may be considered the most valuable varieties of each as objects of cultivation.

APPLES are the most numerous class in cultivation. It has been conjectured that they were brought to this country by the Romans; but it is doubtful whether the varieties then introduced would succeed in this climate, presuming on the fact that the *Malo di Carlo*, well known as being so exceedingly beautiful and delicious in the North of Italy, has, in one of our finest English summers, proved pale and insipid, and that the apples of the South of Europe are generally worthless in England. A hardier breed, it is more than probable, was introduced by the Normans, especially of such as were suited for the manufacture of cider.

Apples are usually divided into three principal sorts, according as they are fitted for dessert, for kitchen use, or for cider. For dessert, the following are early varieties: Early Red Margaret, Early Harvest, Oslin, Kerry Pippin, and Summer Golden Pippin. In succession to these, the Wormsley Pippin, King of the Pippins, Golden Reinette, Ribston Pippin, Court of Wick, Pearson's Plate, a remarkably handsome dessert apple, Golden Harvey, one of the very highest excellence, Hughes's Golden Pippin, Herefordshire Pearmain, Lamb Abbey Pearmain, Court-Pendu plat, which blossoms late, thereby escaping the spring frosts, Reinette du Canada, Old Nonpareil, and Scarlet Nonpareil. For early kitchen use: Dutch Codlin, Keswick Codlin, Hawthornden, Nonesuch, which last deserves particular notice on account of its beautiful transparency when made into apple jelly, for which purpose it is the best sort known. For winter and spring use, from many excellent varieties, the following are selected: Blenheim Pippin, which may be also used at dessert, Dumelow's Seedling, Bedfordshire Foundling, Alfriston, Gloria Mundi, Royal Russet, Brabant Bellefleur, Northern Greening, Norfolk Beaufin, from which the 'Beaufins,' or 'Beefins,' so generally to be seen in the London shops, are prepared; and French Crab, which will keep above a year. For cider, Siberian Bitter-Sweet, Foxley, Red Streak, Fox Whelp, Golden Harvey, Coccagee, Hagloe Crab, and Cooper's Red Streak, are amongst the most celebrated.

Of the varieties of PEARS, few, till lately, have originated in this country; most of the kinds in former cultivation were from France, but they generally required the protection of walls. The greater intercourse with the continent consequent upon the establishment of peace in 1815, led to the introduction of a number of new and hardy varieties of this fruit from Belgium, where its cultivation and improvement had been, and still are, attended to with great assiduity. These new varieties, with some of equal merit, and even superior hardiness, raised within the last few years at Downton castle, in Herefordshire, now compose the principal part of the most select lists, and are at the same time rapidly excluding the old French varieties from cultivation.

Pears are divided into three classes, dessert, kitchen, and perry. The following are amongst the finest: for dessert, Citron des Carmes, Jargonelle, which requires a wall; Summer St. Germain, Ambrosia, Fondante d'Automne, White Doyenné, if grown as an open standard; Seckle, Louise Bonne (of Jersey), Marie Louise, Beurré Bosc, Gansel's Bergamot, which also requires a wall; Duchesse d'Angoulême, Beurré Diel, 'Nelis d'Hiver, Althorp Crassane, Winter Crassane, Napoleon, Glout Morceau, Passe Colmar, Knight's Monarch, Neplus Meuris, Easter Beurré, Beurré Rance. These are enumerated in their order of becoming fit for use. For kitchen use: Bezi d'Heri, which is excellent for stewing and very free from grittiness; Bequêne Musqué, Spanish Bon Chrétien, Double de Guerre, Catillac, Uvedale's St. Germain. For perry: Oldfield, Barland, Longland, Teinton Squash.

The best varieties of PLUMS for the dessert are, the Green Gage, Washington, Reine Claude, Violette, Drap d'Or, Kirke's, Coe's Golden Drop, Blue Imperatrice. For kitchen use: Orleans, White Magnum Bonum, Shropshire Damson, which last is excellent for preserving, as are also the St. Catherine, Coe's Golden Drop, Green Gage, and Quetsche; the latter is the sort of which the German Prunes of the shops are made, by slow and repeated drying in an oven.

CHERRIES, it is said, were first cultivated in this country at Sittingbourn, in Kent, where they are supposed to have been introduced about the time of Henry VIII. That county is still famous for a sort called the Kentish cherry, identical with some of the varieties of the Montmorency cherries of the French. They are round, bright red, and acid, and much used for pies. They have also the peculiar property of the stalk adhering so firmly to the stone that the latter may be drawn out without breaking the skin, excepting at the base. The fruit is then dried in hair sieves in the sun, or otherwise placed in a gently heated oven; the cherries will then keep for a year, and have the appearance of raisins. The best cherries for dessert are the Elton, Downton, May Duke, Royal Duke, Knight's Early Black, Early Purple Guigne, Bigarreau, Florence. For preserving, the Kentish and Morello are best.

APRICOTS in cultivation are of few varieties compared with any of the preceding kinds of fruits, and of those the most useful are the following: Large Early, Breda, Moorpark, Royal, and Turkey. The Breda is the best for standards, and when the season is favourable, the fruit on such, although smaller than that grown against a wall, is, notwithstanding, higher flavoured. A variety called the *Musch-Musch* may be noticed, although not recommended for cultivation in this climate. It is the sort grown in the oases in Upper Egypt, where it produces in great abundance, the fruit being dried, and in this state forming an article of commerce for exportation. The apricot blossoms earlier than any other fruit-tree cultivated in this country; hence, most probably, it was called Precocia among the Romans, a corruption of which name is traceable in the modern one of Apricot. In consequence of the tree blossoming so early, its blossoms, particularly in the case of young trees, are extremely liable to drop off in setting. This is not to be wondered at, when it is considered that the ground is frequently at the time (March) in as cold a state as at any period of the whole season, neither the sun's heat nor the warm rains having reached so far below the surface as to warm the soil in contact with the roots; and thus, whilst the latter are in a medium perhaps a little above freezing, the tops, exposed to a bright sun against a wall, are at that period of the season occasionally in a temperature as high as 90° or 100° Fahr. The injurious effects of this disparity must be sufficiently obvious to every one, and the only remedy to be adopted is to have a very complete drainage below the roots, and the whole soil of the border, not retentive, but of a pervious nature. If it could also be kept perfectly dry previous to the commencement of vegetation, and then only allowed to receive the rain when warm, avoiding the cooling effects of melting snow and hail, the tree would thus be placed under circumstances comparatively more natural.

PEACHES and NECTARINES require the aid of a wall to bring them to perfection in this climate; and in the more northern counties of Britain the protection of glass is also requisite. They likewise rank among the kinds of fruits which are considered of sufficient value to be forced. A selection of the best varieties of peaches is as follows:—Noblesse, Red Magdalen, Royal George, Grosse Mignonne, Bellegarde, Late Admirable. The two very best nectarines are the Elruge, which has little or no red at the stone; and the Violette Hâtive, the flesh of which is rayed with red near the stone: this serves as a principal distinction between these two varieties. For the sake of variety, the Pitmaston Orange and the White Nectarine may also be included. A selection of peaches for forcing may consist of the Bellegarde, Noblesse, Grosse Mignonne, Royal George, Royal Charlotte, and Barrington. Nectarines for the same purpose are the Elruge and the Violette Hâtive.

The best variety of QUINCES is the common one. The Portugal Quince is distinct; but its fruit does not ripen so well in this climate as the common quince. Its wood however swells more in conformity with that of the pear, and it therefore is preferable as a stock for pears.

The principal varieties of the MEDLAR are the Large or Dutch, the Upright or Nottingham, and the Stoneless. The first is esteemed for its size, and sometimes for the form of the tree, on account of the rustic crooked appearance which it assumes. The second is of better quality as regards flavour; and the third is small without stones or seeds, and keeps longer than the others.

RASPBERRIES compared with many of the fruits mentioned above, differ little in their character as cultivated varieties from that of the botanical species *Rubus idæus*, from which they have arisen: for instance, the difference between the wild sloe and the green gage is very great; whereas the wild raspberry growing in the woods differs only slightly in flavour, and not widely in size and form from those cultivated in gardens. Good varieties are the Red Antwerp, Yellow ditto, Barnet, Cornish, and Red Globe.

STRAWBERRIES are now considerably reduced in regard to the number of varieties in cultivation. By the introduction of 'Keen's Seedling,' the very coarse sorts have been mostly banished even from the streets of London; this variety having proved the best of all for the market, combining very good flavour with the properties of being of a large size and very prolific. Other varieties deserving cultivation are the Grove End Scarlet, Roseberry, American Scarlet, and where wanted for confectionary, the Old Scarlet, which retains a fine colour, Downton, Elton, Old Pine, Prolific or Conical Hautbois, and the Large Flat do. The alpine and wood strawberries require to be occasionally renewed from seeds; the best varieties are the Red Alpine and the White Alpine. Keen's Seedling, Roseberry, and Grove End Scarlet, are proper for forcing.

GRAPES are brought to high perfection in this country, by the aid of hothouses; in favourable situations some kinds ripen pretty well, even on walls in good seasons: but open vineyard culture is not practised to any extent in England at the present time, nor is it likely ever to become profitable. Varieties of wine grapes therefore need not be noticed here, farther than by stating that they are very numerous; many of them form small compact bunches like the 'Miller's Burgundy,' which is indeed one of them, and is the sort of black cluster grape with woolly, mealy leaves, commonly seen on the walls of houses near London. The following are suitable for a vinery:—Black Frontignan, Black Prince, Black Hamburg, West's St. Peter's, Black Morocco, Red Frontignan, White do., Grizzly do., Royal Muscadine, Chasselas Musqué, White Muscat of Alexandria; the last requires a strong heat. For walls, perhaps none fruits better, or forms a handsomer bunch than the Royal Muscadine; it is preferable to the Sweetwater, which generally forms a ragged bunch in consequence of a great number of the berries being small and abortive; the Black Prince and Esperione will sometimes succeed; and the Early Black July and Burgundy Black Cluster will ripen still better, but the bunches of the latter are very small.

The only fruits still remaining to be noticed, the varieties of which are of any importance, are figs, gooseberries and currants, and pine-apples.

In some parts of England the FIG bears in the open air; but in order to ensure its doing so, a warm, or more strictly speaking, a dry subsoil is absolutely necessary, whether it be grown as a standard in the open ground or against a wall, or forced under glass. Wherever the soil is retentive of water, it will retain the coldness of winter till late in the spring. In fact, if the subsoil be very wet, its temperature will approximate to that of spring water, which in England is little above 50° Fahr. throughout the whole year; an amount of cold which the roots of the fig are certainly not accustomed to in summer in its native climate in Asia and Barbary, or even where it has been naturalised in the South of Europe. Or, if the springs should fall so low during summer, as to leave the roots of the Fig tree unaffected by their presence, the temperature of the surface will be suddenly raised by the first rain that falls. This often takes place towards the end of summer, and a superabundant growth ensues, too late for being completed before winter. Figs succeed well in Sussex, where the subsoil is chalk, and the rain passes off as it falls; and in preparing borders for it, the whole should be composed of such materials as are pervious to water. Some of the finest varieties of figs for this climate are the Brown Turkey, Brunswick, White Marseilles, Nerii, Pregussata, White Ischia, Brown Ischia, Yellow Ischia. The Brown Turkey is well adapted for forcing, for which purpose the Pregussata, White Marseilles, and the White, Brown, and Yellow Ischias are also proper.

GOOSEBERRIES are brought to greater perfection in Britain than in any other country. The varieties are numerous, and many of them have been raised in Lancashire, chiefly by the manufacturing population, with a view to prizes. It is to be regretted that the latter have generally been awarded solely with reference to weight; hence a number of large but coarse sorts have been brought into cultivation. In making the following selection, flavour and not size has been kept in view.

Fruit, red: Red Champagne; Red Warrington; Keen's Seedling Warrington; Rough Red, used for preserving; Red Turkey; Rob Roy; Ironmonger. *Fruit, yellow:* Yellow Champagne; Early Sulphur; Rumbullion, which is much used for bottling. *Fruit, green:* Early Green Hairy; Pitmaston Green Gage; Green Walnut; Parkinson's Laurel; Massey's Heart of Oak; Edwards's Jolly Tar. *Fruit, white:* White Champagne; Early White; Woodward's Whitesmith; Taylor's Bright Venus; Cook's White Eagle; White Honey.

The varieties of CURRANTS preferable for cultivation are very few. Of black currants, the Black Naples and the Black Grape are the best. The White Dutch, Red Dutch, Knight's Sweet Red, and Knight's Large Red, are the best sorts of white, and red currants.

The Pine-Apple is the only tropical fruit which is cultivated to any extent in this country. The best varieties are the Queen, Moscow Queen, Black Jamaica, Brown Sugar-loaf, and Black Antigua; the Enville and White Providence are cultivated more for their size than flavour.

FRUITS, PRESERVATION OF. The apple and pear, the two staple fruits of this country, are of so much importance to great numbers of persons, that we shall not dismiss this subject without giving some information concerning the best means of preserving them during the autumn and winter; for it is an object of no little moment to be able to prolong the duration of the season of these fruits even for a single month.

A few early varieties may be eaten from the tree, or when recently gathered; but the greater and by far the most valuable portion require to be kept for some time until they acquire a proper degree of mellowness: thus, most pears are extremely hard when gathered; some even remain so during the winter, and only become melting, or of a buttery consistency, in the spring. Apples, although it is their property to remain a long time nearly as crisp as when gathered, yet are at first too acid for the dessert, and require to be stored up in the same manner as pears, until their juices acquire a rich sugary flavour. Many varieties indeed permanently retain their acidity, but such are only proper for culinary purposes, for which indeed their briskness renders them eligible.

With regard to the gathering and storing of apples or pears, having in view their most perfect preservation, it is necessary that the gathering should be performed in all cases when the trees and fruit are perfectly dry. No precise time can be specified as to the period of the season when any particular variety ought to be taken; for this is influenced variously by circumstances connected with soil, climate, and situation. The best general rule is, to gather when the fruit-stalk separates easily from the spur, on the fruit being raised by the hand from its natural or pendulous position. There are scarcely any exceptions to this rule, unless as regards a few of the summer and early autumn varieties, in which the flavour is improved by gathering a little earlier than is indicated by the above criterion.

The treatment of the fruit after gathering is by no means uniform; some lay it directly on the shelves of the fruit-room, or wherever else it is intended to remain till fit for use; others cause it to undergo a process of fermentation, called sweating, by throwing it in a heap, and covering it with some dry substance, generally straw; in some instances even blankets have been used for this purpose. After it has perspired for ten days or a fortnight, it is spread out at a time when the air is dry, in order to expedite the evaporation of the moisture. All unsound specimens, or even such as are suspected of being so, are then separated. In the case of particularly valuable sorts, it has been recommended to wipe off the moisture with flannel; but this proceeding, for reasons hereafter to be explained, is not advisable.

With regard to the final storing up, as it has been proved by experience that certain methods successfully practised by some, have turned out a failure when attempted by others, and as these fruits are extensively cultivated by persons variously circumstanced, some of whom are compelled by necessity to practise perhaps not the very best mode, but the best they can command, it will be proper to detail the various methods that have hitherto been tried, in order that such as are most deserving of recommendation may be pointed out, as well as those which ought to be avoided in every possible case.

The following are the different modes in which apples and pears have been deposited for winter use:—1. In single layers on the bare shelves of a fruit-room. 2. In the same manner, but covered with light canvass, which must be dried occasionally, as it absorbs the evaporation. 3. In close drawers; one layer, or several layers in depth. 4. In dry casks without any interposing material; a few weeks after they are first put in they require to be carefully picked over, the casks made perfectly dry and re-filled, the head closely fitted, and the fruit on no account disturbed till unpacked for use. 5. In boxes, casks, large garden pots, or jars, with pure and dry sand interposed between the layers of fruit. 6. In jars in which no sand or other substance is allowed to come in contact with the fruit, the mouths of the jars being covered with a piece of slate, and the whole plunged in a quantity of dry sand, so as to be several inches from the free atmosphere. The sand being a slow conductor of caloric, the sudden changes of temperature and their powerful effects in causing the decay of fruits are avoided. 7. In heaps in a dry airy loft, a slight covering of straw being given to protect them from frost. 8. In baskets lined with straw. 9. In close cellars excluded from the light, which is in all cases injurious. 10. In dark but airy vaults. 11. On a small scale, under a bell-glass cemented down air-tight; this must not be done on wood the least resinous, for even the white deal, which, when made into open shelves, communicates none of its flavour to the fruit, yet when supporting a close bell-glass, strongly taints whatever fruit is placed in it, by the confined and accumulating exhalation. 12. Buried in a box placed on four bricks, under another box inverted, in an excavation so deep that the upper portion of the fruit may be 1½ or 2 feet below the surface of the earth. 13. In threshed grain, or in corn stacks. 14. Reposing on wheat straw, with or without a covering of the same. 15. In chaff of wheat or oats. 16. In flax-seed chaff. 17. In powdered charcoal; this, if it cannot prevent, will in no degree contribute to decay, either internally or externally. It is the substance in which the imported Newtown pippins are frequently packed, and they would arrive much sounder than they do were it not for the bruises they evidently appear to have received previous to exportation. 18. In dried fern leaves.

Amongst so great a variety of modes, it is obviously of considerable importance to ascertain not only which are the best, but which experience has proved to be the worst. This inquiry is most advantageously pursued by settling in the first instance what the circumstances are that have been universally found detrimental to the preservation of fruits. As was remarked when mentioning the sixth mode, atmospheric changes have very great, if not the most powerful influences: firstly, as regards their calorific effects, and secondly, their hygrometrical. In the former respect, the expansion and condensation occasioned by the rise and fall of temperature must work a change in the state of the juices, doubtless often at variance with the gradual chemical change which these juices naturally undergo; hence, those fruits that are most exposed to vicissitudes of temperature are found to be most apt to fail in attaining their full sugary mellow perfection. Again, when warm weather suddenly succeeds cold, the air in the room is of a higher temperature than the fruit, until such time as the latter acquire from the former an equality of temperature; and until such time as this takes place, the fruit, from its coldness, acts as a condenser of the vapour existing in the warmer atmosphere by which it is surrounded, and the surface consequently becomes covered with a great deposition of moisture, as will be the case with a glass filled with water colder than the atmosphere of a room into which it is brought. The more smooth and glossy the variety of apple or pear, the greater is the condensation on its surface. Russeted apples and pears exhibit the least effects in this way, their rough dry coat being in less immediate contact with the cold juices of the fruit.

From the above it is sufficiently evident that variations in the state of the atmosphere, as regards its temperature, have injurious effects by the expansion and condensation of the juices, and by the deposition of moisture on the surface, partly owing to atmospheric humidity, but chiefly to the circumstance of the latter being condensed upon the fruit, as above explained. This deposition of moisture tends to decompose the skin and to render it less efficacious as a protector. It therefore follows, that where fruit is not kept closely packed, it should be exposed to as little change of temperature as possible, and should also be preserved from the full effects of an atmosphere saturated with moisture. If a circulation of air could be secured of a uniform temperature and dryness, or nearly so, there is no doubt as to the superiority of flavour which the fruit would acquire. The watery particles would exhale, and at the same time shrivelling would not take place to any great extent, for this chiefly occurs in consequence of expansion and contraction, and alternate moisture and dryness of the surface, the results of irregularities in the state of the atmosphere. It may be here observed, that wiping the fruit is injurious. The skins of fruits are more or less covered with a secretion, technically called the *bloom*, which every one will have observed on grapes and plums, on both of which it is very conspicuous, and although less so on apples and pears, yet it does exist on them, and its use is to pro-

tect, in a great measure, the skin from the effects of moisture. Some fruit-growers are so well aware of this that they will not even handle their most choice wall-pears in gathering, except by the stalk.

Light is found to be injurious; all agree that fruit keeps best in total darkness. This arises from a specific stimulus being exercised upon the vegetable tissue by this agent. If a leaf, a green branch, or such a green surface as that of an apple or pear be exposed to light, even in the most diffused state, evaporation takes place; but as soon as the stimulus of light is withdrawn, evaporation ceases. Speaking of plants in general, evaporation from the green parts takes place all day long and ceases at night.

The preceding observations will explain the reason why a fruit-room is best in a dry situation, on the north side of a wall or other building where the sun's heat will not readily disturb the temperature. The roof should be double, and the walls hollow; the windows small. There should be a full command of ventilation; but the room should also be capable of being entirely shut up.

Ventilation should be used only when the air, owing to the exhalations from the fruit, is not perfectly sweet; when this is not the case, air must be admitted in whatever condition it may happen to be; but it would be most desirable to admit air copiously *only when it is of an equal temperature with that of the interior of the room.* The latter should be in two or three compartments, in order to keep the late sorts entirely free from the contaminating effects of exhalations of fruit in a fully ripe state.

These being the conditions under which the ripening, decay, and preservation of apples and pears always take place, the reader will have no difficulty in judging of the relative advantages of the 18 methods already named. It is obvious that Nos. 1, 2, 3, 4, 5, 6, 7, are plans in which the circumstances essential to the preservation of fruit are nearly completely complied with. Nos. 8, 11, 14, 15, and 16, are bad, either because of the liability of the material in which they are packed to decomposition, by which the fruit acquires a tainted musty taste, or because they can only be applied on a very small scale. Nos. 9 and 12 are chiefly objectionable because, owing to the almost total absence of evaporation, the fruit, although well preserved and plump, is apt to be watery and tasteless. No. 17 is a troublesome and dirty practice; Nos. 13 and 18 are excellent when opportunity occurs of practising them; but No. 10, in dark but airy vaults, is undoubtedly that which most completely complies with the conditions necessary for preservation, and is much the best. We have known apples, that are usually decayed in February, preserved till Midsummer in this manner, in all their freshness and colour, and nearly all their flavour.

With regard to nuts and walnuts, the only precaution that it is necessary to take for their preservation is to maintain the air in which they are placed in a constant state of moisture. Burying in the earth, placing in a damp cellar, mixing with damp sand, and many such plans have been recommended; but they are all objectionable, either because they keep the fruit too moist, or do not offer any impediment to its becoming mouldy. We believe the best of all plans is to pack them in glazed earthen jars, throwing a small quantity of salt on the last layer before the jar is closed.

Apples and pears dried in ovens may be preserved for years. Bosc states that he has tried the latter, after three years' preservation, and found them still good; but they are best during the first year. They are placed in the oven after the bread is drawn. The process is repeated a second, third, or fourth time, according as the size or nature of the fruit may require. The heat must not be so great as to scorch, nor must the fruit be dried to hardness. When properly done, they are kept in a dry place. Another method, chiefly practised on the rousselets, and of these the rousselet de Rheims is the best for the purpose, is to gather the fruit a little before maturity; after being half boiled in a small quantity of water, they are peeled and drained. They are then placed in the oven, and heated to a suitable degree, for twelve hours. They are then steeped in syrup, to which have been added brandy, cinnamon, and cloves. They are again returned to the oven, which is heated to a less degree than at first: this operation is thrice repeated.

The flattened dried apples, called *beaufins*, so abundant in the London shops, are prepared in Norfolk, from a variety of apple called the Norfolk beaufin: it has a thick skin, which resists, without bursting, the heavy pressure to which the apples are subjected in the oven, during the slow and lengthened process of drying.

FRUME'NTIUS. [Abyssinian Christians; Axum.]

FRUSTUM, a portion cut off from any solid figure. The term is most frequently applied in the case of the cone, and conoidal surfaces of revolution. By 'frustum of a cone' is meant any part cut off from a cone which does not contain the vertex. This distinction is drawn because any part of a cone which contains the vertex is another cone.

FU'CINUS. [Celano.]

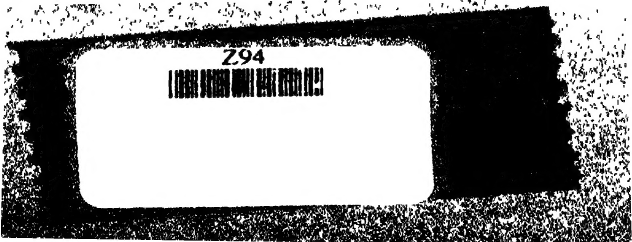
FUCOI'DEÆ. [Pseudozoaria.]

FUCUS. [Sea Weed.]

FUEGO. [Mozambique.]

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